
# Federal Fiscal Year 2017 Strategic Plan for Traffic Records Improvements

*Prepared for:*

**National Highway Traffic Safety Administration**
**U.S. Department of Transportation**

*Submitted by:*

**Highway Safety Division of the Executive Office of Public Safety and Security in Conjunction with the Massachusetts Traffic Records Coordinating Committee**

June 2016

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# 1.0 BACKGROUND

The Commonwealth's Strategic Plan for Traffic Records Improvements last received a major overhaul in 2010. The plan included information regarding a recent National Highway Traffic Safety Administration (NHTSA) - sponsored Commonwealth of Massachusetts Traffic Records Assessment (March 2009); development of the Massachusetts Statewide e-Citation and Traffic Records System Business Plan (September 2009); and establishment of a Massachusetts Executive-Level Traffic Records Coordinating Committee (METRCC).

## 1.1 INTRODUCTION

This update to the Commonwealth's Strategic Plan for Traffic Records Improvements was developed by the Massachusetts Executive Office of Public Safety and Security's (EOPSS) Highway Safety Division (HSD), with support from the Massachusetts Traffic Records Coordinating Committee (TRCC). The purpose of this document is to provide all traffic safety stakeholders in the Commonwealth of Massachusetts with a strategic plan for traffic records improvements to advance the performance and quality of the State's traffic records data. The plan is based primarily on recommendations identified through the 2014 Commonwealth of Massachusetts Traffic Records Assessment and the 2013 Crash Data Improvement Program. This plan is aimed at actions that the State's TRCC can help accomplish through its members pursuing the goal of improving traffic records.

### Traffic Records Coordinating Committee

The TRCC is a statewide stakeholder forum created to facilitate the planning, coordination and implementation of projects to improve the State's traffic records system. The Massachusetts TRCC is a partnership of representatives from the transportation, law enforcement, criminal justice, and health professions. As such, the TRCC is the body responsible for improving the performance and quality of the data, which is used to support highway safety analyses and countermeasure selection in the state. The Commonwealth's TRCC is comprised of two tiers: a working-level TRCC and the METRCC. Together, the two tiers are responsible for developing, maintaining, and tracking accomplishments related to the state's Strategic Plan for Traffic Records Improvement.

## 1.2 ROLE OF THE WORKING-LEVEL TRCC

The working-level TRCC is the primary means by which communication is facilitated and perpetuated between the various users and collectors of data and

owners and custodians of the data systems which make up a state's traffic records system. The working group members represent most facets of traffic records which include driver and vehicle, crash, injury surveillance, roadway, and citation and adjudication data. This traffic records coalition fosters understanding among stakeholders and promotes the use of safety data in identifying highway safety problems and developing effective countermeasures to improve highway safety. Agenda items vary from meeting to meeting, but will typically include the following: updates of federally-funded Traffic Records projects, presentations on (and review of) Traffic Records funding, Availability for Grant Funding (AGFs), formation of TRCC sub-committees, and open discussions related to traffic records.

## Core Data System Representation

The Commonwealth's traffic records system is comprised of the following six core traffic safety information systems:

- Crash Data System;
- Driver License/History Data System;
- Injury Surveillance/EMS Data System;
- Roadway Data System;
- Citation/Adjudication Data System; and
- Vehicle Registration Data System.

TRCC member representation for each of these core systems is described below:

### *Crash Data System*

Karen Perduyn
Crash Data Manager
Massachusetts Registry of Motor Vehicles
Phone: (857) 368-7417
Email: Karen.Perduyn@state.ma.us

### *Driver License/History Data System*

Joan Valley
Director of Business Development
Massachusetts Registry of Motor Vehicles
Email: Joan.Valley@state.ma.us

### *Injury Surveillance/EMS Data System*

Michael Sinacola
Interim Director
Office of Emergency Medical Services
Massachusetts Department of Public Health
Phone: (617) 753-8086
Email: Michael.Sinacola@.state.ma.us

### *Roadway Data System*

Kevin Lopes
Manager of GIS Services
Office of Transportation Planning
Massachusetts Department of Transportation
Phone: (857) 368-8880
Email: Kevin.Lopes@state.ma.us

### *Citation/Adjudication Data System*

Cynthia Williams
Merit Rating Board
Phone: (857) 368-7602
Email: Gregory.Denton@state.ma.us

### *Vehicle Registration Data System*

Joan Valley
Director of Business Development
Massachusetts Registry of Motor Vehicles
Email: Joan.Valley@state.ma.us

## TRCC FFY 2016-2017 Charter

The working level TRCC's membership, organization, vision, mission, purpose, functions and governance are enumerated in the TRCC FFY 2016-2017 Charter.

Commonwealth of Massachusetts
Traffic Records Coordinating Committee (TRCC)
FFY 2016-2017 Charter

ORGANIZATION

By recommendation of the National Highway Traffic Safety Administration (NHTSA) and the Commonwealth of Massachusetts' strategic planning activities, the Executive Office of Public Safety and Security (EOPSS) convened the first meeting of its Massachusetts Executive-Level Traffic Records Coordinating Committee (METRCC) on January 22, 2010. The purpose of a two-tier Traffic Records Coordinating Committee will be to establish and coordinate strategic, long-term planning activities at the executive-level and to continue to identify needs and solutions to current issues by a broad working-level stakeholder group, the working level TRCC. In Massachusetts, the METRCC and TRCC share the same mission and vision.

MISSION

Through the coordinated efforts of its member organizations, provide a forum for the creation, implementation, management and dissemination of accessible, accurate, complete, consistent, integrated, timely, and useful traffic records data to aid decision-makers working to reduce transportation-related fatalities, injuries, and economic losses in Massachusetts.

VISION

Save lives and reduce injuries on Massachusetts roadways by using efficient processes to collect, store, and analyze complete and accurate traffic safety information and by making it freely available to all safety stakeholders.

PURPOSE

Ensure that accurate, complete, and timely traffic safety data is collected, analyzed, and made available for decision making by TRCC member organizations and other public and private professionals. In accordance with the requirements contained in the Federal Register, Vol. 78, No. 15, January, 23 2013, p. 5016, key functions of the TRCC will include, but not be limited to:

- Provide a forum for the discussion of highway safety data and traffic records issues and report on any such issues to the agencies and the organizations in the Commonwealth that create, maintain and use highway safety data and traffic records;
- Include representatives from the six core data systems that make up a State Traffic Records system (crash, citation, driver, vehicle, roadway, and injury surveillance systems) as well as users, collectors, and providers of traffic safety data;
- Consider the views of and facilitate discussion between organizations in the Commonwealth that are involved in the administration, collection and use of the highway safety data and traffic records system;

- Represent the interests of the TRCC to outside organizations;
- Assist TRCC members applying for public and private funds to support and improve traffic records;
- Under the direction of the METRCC, periodically review the status of selected Traffic Records data systems and provide feedback on the impact of any proposed changes on TRCC stakeholders;
- Provide monitoring assistance, implementation support, and reporting to the METRCC of annual projects approved for funding under the Traffic Records Strategic Plan;
- Organize working groups as appropriate to address technical and programmatic needs of the METRCC;
- Facilitate the implementation of projects designed to enhance traffic records reporting, recording, accuracy, and dissemination;
- Document its collective support of the Traffic Records Strategic Plan to the METRCC and assure that the Plan is appropriately updated each year for METRCC approval in the areas of deficiencies, performance goals and measures and specific project descriptions;
- Review proposed projects submitted in response to the Commonwealth's annual Section 405C application process (administered by the EOPSS, Office of Grants and Research, Highway Safety Division (EOPSS/HSD) to the NHTSA and provide project recommendations to the METRCC; and

Notwithstanding the above, the TRCC recognizes:

- The responsibility of its member agencies to work collaboratively to achieve the statewide vision for traffic safety information systems;
- The responsibility of its member agencies to manage their own safety information systems to accomplish their mission by improving internal business processes;
- The need to create a collective sense of responsibility among its member agencies for developing and sharing safety data in support of the State's highway safety mission in a manner that minimizes cost, duplication of effort, and inefficiencies;
- The need to ensure regular communication with the Commonwealth's METRCC regarding the issues they face at the day-to-day working level; and
- The need to work within their organizations to implement the recommendations of the *Commonwealth of Massachusetts Traffic Records Assessment*, 2014.

GOVERNANCE OF TRCC

The Commonwealth's Traffic Records Coordinator will be appointed by the Director of the EOPSS/HSD to support both the METRCC and the working-level TRCC. The Traffic Records Coordinator also will serve as the chair of the TRCC. The Traffic Records Program Coordinator for the EOPSS/HSD will be the vice chair and will serve in the chair's absence. Each working-level TRCC Member Organization shall designate its member of the working-level TRCC.

TRCC members, including sub-committees as well as the local law enforcement and regional planning agency representatives, will be renewed each year in October. The TRCC will meet a minimum of four times per year.

A majority vote will be sufficient for normal TRCC business matters.

I accept the Commonwealth's TRCC Charter. This approval is effective through September 30, 2017.

_____ _____

Name: Date

TRCC MEMBER ORGANIZATIONS

Office of Transportation Planning – Roadway System

Department of Public Health – Injury Surveillance System

Registry of Motor Vehicles – Crash, Driver, and Vehicle Systems

Municipal Police Training Committee

Merit Rating Board – Citation/Adjudication System

Center for Health Information and Analysis- Injury Surveillance System

Local Police Departments (One member of the Massachusetts Chiefs of Police Association and one member of the Association's Technology Committee) and the Boston Police Department

Regional Planning Agencies (Boston Metropolitan Planning Organization and up to three recommended by the Massachusetts Association of Regional Planning Agencies)

Office of Grants and Research, Highway Safety Division

Massachusetts Department of Transportation, Highway Division

Massachusetts State Police

Office of the Chief Medical Examiner

Administrative Office of the Trial Court

Emergency Medical Services (Boston Emergency Medical Services / Boston Public Health Commission

University of Massachusetts/UMassSafe

Center for Leadership in Public Service at Fisher College

Department of Fire Services, Office of the State Fire Marshal

Executive Office of Public Safety and Security, Office of Technology and Information Services

Current advisory members, with no voting powers:

National Highway Traffic Safety Administration (NHTSA)

Federal Highway Administration (FHWA)

Federal Motor Carrier Safety Administration (FMCSA)

# 1.3 ROLE OF THE METRCC

The METRCC was established, through coordinated efforts of its member organizations, to provide a forum for the creation, implementation, management and dissemination of accessible, accurate, complete, consistent, integrated, timely, and useful traffic records data to aid decision-makers working to reduce transportation-related fatalities, injuries, and economic losses in Massachusetts. The METRCC is composed of agency directors who set the vision and mission for the working-level TRCC. The METRCC reviews and approves actions proposed by the working-level TRCC. The METRCC meets once per year and more often as necessary.

## METRCC FFY 2016-2017 Charter

The Massachusetts Executive-Level TRCC's membership, organization, vision, mission, purpose, functions and governance are enumerated in the METRCC FFY 2016-2017 Charter.

Commonwealth of Massachusetts
Executive-Level Traffic Records Coordinating Committee
FFY 2016-2017 Charter

ORGANIZATION

By recommendation of the National Highway Traffic Safety Administration (NHTSA) and the Commonwealth of Massachusetts' strategic planning activities, the Executive Office of Public Safety and Security (EOPSS) convened the first meeting of its Massachusetts Executive-Level Traffic Records Coordinating Committee (METRCC) on January 22, 2010. The NHTSA Commonwealth of Massachusetts Traffic Records Assessment, which took place March 16-20, 2009, recommends that Massachusetts "establish the Executive-Level of the Traffic Records Coordinating Committee (TRCC) to ensure full support and authorization of the TRCC and its members by the executives of all agencies in whose area of responsibility the components of the traffic records system fall." To that end, EOPSS invited owners of the core traffic records systems and a small representative sample of data consumers and collectors (see below) to join the METRCC. Broader stakeholder participation will remain at the working-level TRCC.

MISSION

Through the coordinated efforts of its member organizations, provide a forum for the creation, implementation, management and dissemination of accessible, accurate, complete, consistent, integrated, timely, and useful traffic records data to aid decision-makers working to reduce transportation-related fatalities, injuries, and economic losses in Massachusetts.

VISION

Save lives and reduce injuries on Massachusetts roadways by using efficient processes to collect, store, and analyze complete and accurate traffic safety information and make it freely available to all safety stakeholders.

PURPOSE

Ensure that accurate, complete, and timely traffic safety data is collected, analyzed, and made available for decision making by METRCC member organizations and other public and private professionals. In accordance with the requirements contained in the Federal Register, Vol. 78, No. 15, January, 23 2013, p. 5016, key functions of the METRCC will include, but not be limited to:

- Maintain authority to review any of the State's highway safety data and traffic records systems and any changes to such systems before the changes are implemented;
- Provide a forum for the discussion of highway safety data and traffic records issues and report on any such issues to the agencies and the organizations in the Commonwealth that create, maintain and use highway safety data and traffic records;
- Consider and coordinate the views of organizations in the State that are involved in the collection, administration, and use of highway safety data and traffic records systems, and represent those views to outside organizations;
- Represent the interests of the TRCC to outside organizations;
- Review and evaluate new technologies to keep the highway safety data and traffic records systems up-to-date;
- Assist TRCC members applying for public and private funds to support and improve traffic records;
- Facilitate the implementation of projects designed to enhance traffic records reporting, recording, accuracy, and dissemination;
- Assure the traffic records plan incorporates IT strategies and business plans and documents all sources of funding for data improvement projects in the plan;
- Approve the Commonwealth's annual Section 405C application submitted by EOPSS, Office of Grants and Research, Highway Safety Division (EOPSS/HSD) to NHTSA;
- Approve expenditures of Traffic Records funding received by EOPSS/HSD;
- Based on Section 405C guidelines, review and approve annual updates to the Massachusetts Strategic Plan for Traffic Records; and
- Approve annually the membership of the TRCC, the TRCC coordinator, any change to the State's multi-year Strategic Plan, and performance measures to be used to demonstrate quantitative progress in the accuracy, completeness, timeliness, uniformity, accessibility or integration of a core highway safety database.

Notwithstanding the above, the METRCC recognizes:

- The responsibility of its member agencies to work collaboratively to achieve the statewide vision for traffic safety information systems;

- The responsibility of its member agencies to manage their own safety information systems to accomplish their mission by improving internal business processes;
- The need to create a collective sense of responsibility among its member agencies for developing and sharing safety data in support of the State's highway safety mission in a manner that minimizes cost, duplication of effort, and inefficiencies;
- The need to ensure regular communication with the Commonwealth's TRCC regarding the issues they face at the day-to-day working level;
- METRCC member agencies will engage in open communication to maximize the effectiveness, compatibility, and interoperability of any federally-funded projects in conjunction with the Strategic Plan for Traffic Records Improvements and will facilitate compliance with all federal reporting requirements.

GOVERNANCE OF THE METRCC

The Commonwealth's Traffic Records Coordinator will be selected by the Director of the HSD to support both the METRCC and the working-level TRCC. The Traffic Records Coordinator also will serve as the chair of the TRCC. At this time, the METRCC will be chaired by the EOPSS Undersecretary for Forensic Science and Technology. The Director of the HSD will serve as vice chair to serve in his/her absence. Each METRCC Member Organization shall designate its member of the METRCC.

METRCC members, including sub-committees as well as the local law enforcement and regional planning agency representatives, will be renewed each year in October. The METRCC will meet a minimum of once per year and as needed.

Each METRCC member organization will have one vote. The METRCC may extend membership to additional organizations and representatives by majority vote. Votes requiring a 2/3 majority of the METRCC include approvals of the Massachusetts Strategic Plan for Traffic Records and all updates, approvals of Section 405C applications, and approvals of traffic records projects for Section 408 funding. A majority vote will be sufficient for normal METRCC business matters.

I accept the Commonwealth's METRCC Charter. This approval is effective through September 30, 2017.

_____ _____

Name: Date

METRCC MEMBER ORGANIZATIONS

Executive Office of Public Safety and Security

Office of Transportation Planning – Roadway System

Department of Public Health – Injury Surveillance System

Registry of Motor Vehicles – Crash, Driver, & Vehicle Systems

Merit Rating Board – Citation/Adjudication System

Center for Health Information and Analysis- Injury Surveillance System

Massachusetts Chiefs of Police Association

Massachusetts Major City Chiefs

Office of Grants and Research, Highway Safety Division

Municipal Police Training Committee

Massachusetts Department of Transportation, Highway Division

Massachusetts Association of Regional Planning Agencies

Massachusetts State Police

Executive Office of Administration and Finance

Administrative Office of the Trial Court

Executive Office of Public Safety and Security, Office of Technology and Information Services

Current advisory members, with no voting powers:

National Highway Traffic Safety Administration (NHTSA)

Federal Highway Administration (FHWA)

Federal Motor Carrier Safety Administration (FMCSA)

## 1.4 TRAFFIC RECORDS ORGANIZATION

**Daniel Bennett, Secretary of Public Safety and Security and Governor's Representative for Highway Safety,** oversees EOPSS, which is the lead agency for traffic records in the Commonwealth.

**The METRCC,** formed in 2009, is chaired by Curtis Wood, Undersecretary of Forensic Science and Technology for EOPSS. The METRCC is responsible for establishing a strategic vision for traffic records in Massachusetts. The METRCC also provides executive-level coordination and support for projects managed by the working-level TRCC.

**The working-level TRCC** is currently chaired by the Traffic Records Program Coordinator within the EOPSS Highway Safety Division. The TRCC is the working group responsible for implementing traffic records projects and providing day-to-day coordination of systems, data and activities. This includes identifying required system enhancements and opportunities to share data between systems. The working-level TRCC also reviews Traffic Records grant applications and makes recommendations to the METRCC regarding project priorities. Other TRCC purposes and responsibilities are enumerated in the TRCC charter in Section 1.2.

The TRCC currently includes subcommittees, which meet as needed. Information regarding the subcommittees is below:

**Data for the Strategic Highway Safety Plan –** The purpose of the subcommittee is to help identify emphasis areas and develop goals, objectives, and strategies for the Strategic Highway Safety Plan.

**The Information Technology (IT) representatives are appointed by members of the METRCC.** These individuals are high-level IT executives from METRCC agencies who evaluate projects to ensure statewide IT protocols are met and system integration in and between agencies is considered. While reviewing

projects, they take into account day-to-day needs and recommendations of the TRCC agencies, the vision for traffic records contained in the METRCC and TRCC charters, and executive-level priorities. After reviewing the Traffic Records grant applications, the IT representatives make recommendations to the METRCC regarding project priorities.

The METRCC, using feedback from the TRCC and IT representatives, recommends the project priorities to the Secretary of EOPSS.

## 1.5 SUMMARY OF OTHER SECTIONS

The remainder of 2017 Strategic Plan for Traffic Records Improvements consists of three primary sections:

### Section 2: Traffic Records Systems

This section provides background information on each of the six core data systems and documents accomplishments for each system.

### Section 3: Traffic Records Assessment

This section provides an overview and summary of the 2014 Commonwealth Traffic Records Assessment process and results. This includes both the deficiencies and recommendations for each core data system identified in the Assessment Final Report. Also included are brief descriptions of how the Commonwealth has or intends to address each of the recommendations. For recommendations the Commonwealth does not intend to implement, an explanation is provided.

### Section 4: Crash Data Improvement Program (CDIP)

This section provides an overview and summary of the recommendations from the 2013 CDIP. The CDIP is designed to help States develop and improve methods of assessing the quality of their crash data. The CDIP process examines the quality characteristics of timeliness, accuracy, completeness, consistency/uniformity, integration, and accessibility. `

### Section 5: Traffic Records Projects

Section 5 provides a list of traffic record projects in Massachusetts, including:

- **FFY 2017 Projects** – These are projects that are planned for FFY 2017. They include projects being funded through the Traffic Records Program as well as other sources.

- **Completed projects** – These are projects listed in previous strategic plans dating back to 2005 that have been completed.

This section also provides the criteria used for project selection as well as information on the anticipated performance impact (i.e., improvements in accuracy, timeliness, accessibility, completeness, data integration, and uniformity) of the planned projects.

# 2.0 Traffic Records Systems

Massachusetts operates a complete set of systems to receive, store and manage traffic records information. These systems are managed by the following agencies:

- The Registry of Motor Vehicles Division (RMV) of the Massachusetts Department of Transportation (MassDOT) manages the crash, driver history and vehicle registration systems;
- The Merit Rating Board (MRB) maintains operator driving history records consisting of at-fault accident claim records, comprehensive claim records, out-of-state incidents and civil and criminal traffic citation information;
- The Administrative Office of the Trial Court (AOTC) manages adjudication information;
- The MassDOT Office of Transportation Planning (OTP) manages the road inventory file; and
- The Department of Public Health (DPH) and the Center for Health Information and Analysis (formerly known as the Division of Healthcare Finance and Policy) manage injury surveillance-related information systems.

The following provides background information on each system and documents accomplishments for each system since the creation of the 2005 Strategic Plan.

## 2.1 CRASH DATA SYSTEM

The RMV operates the Commonwealth's Crash Data System (CDS). Reports of 125,000 crashes are received annually by the RMV. Approximately 70 percent of crash reports are received electronically from state and local law enforcement agencies. The remainder is received on paper using either the Motor Vehicle Crash Police Report (newly revised in July 2015) or the Motor Vehicle Crash Operator Report (last revised in May 2002) or both. Police reports may be used to document the date, time, location, environment and characteristics of a crash.

The crash reporting criterion for both police and operators are: Any crash involving damage to any one vehicle or property exceeding $1,000, or any injury or fatality.

The MassDOT Highway Division, Traffic Engineering and Safety Section developed an automated process for attaching location coordinates to crash master records that has been in use since 2006. This process is based on standards for location data on crash reports coupled with an extensive set of location matching algorithms that can take the street names, route numbers, exit numbers, mile markers and other location data as supplied in crash reports. Continuing improvements have been made to these algorithms to try and improve geocoding and offset the data quality issues surrounding electronic submission. Extensive updates have been made to the MassDOT Planning Roadway Inventory road names (a project completed in 2014) to also improve the matching/geocoding rate. Crashes that are unable to be automatically geocoded are reviewed and located manually, depending on staffing availability. Geocoder algorithm improvements has enabled the statewide crash record geocoding rate to remain above 90%: 94% for 2009, 92% for 2010, 95% for 2011, 93% for 2012, 96% for 2013, and 96% for 2014 (however, this number may change since the RMV was still receiving 2014 crash reports at the time this percentage was calculated). This following is the percentage of geocoded crashes that were geocoded manually: 10.97% for 2009, 9.95% for 2010, 10.77% for 2011, 9.26% for 2012, 13.37% for 2013, and 12.62% for 2014 (preliminary).

The RMV implemented a web service in 2010 that provides additional capabilities to monitor data quality of crash reports submitted electronically. A tool was also developed for authorized users (TRCC members, researchers, law enforcement, regional planners, etc.) to view all electronic police crash reports including the narrative and diagram.

## 2.2 ROADWAY DATA SYSTEM

The MassDOT Office of Transportation Planning (OTP) maintains the Road Inventory File (RIF) for Massachusetts. This file, which contains more than 35,000 centerline miles and more than 70,000 lane miles of roads, serves as the foundation for the State's Geographic Information System (GIS). This file also is used for a variety of purposes, such as:

- Identifying functional classification, jurisdiction, and National Highway System (NHS) status of all roadways in the State;
- Helping to fulfill the Federal Highway Administration's Highway Performance Monitoring System (HPMS) reporting requirements;
- Determining centerline miles by city/town for allocating State Aid Funds to communities; and
- Supporting development of safety improvement projects.

The Traffic Engineering Section of the Highway Division of MassDOT works in concert with RMV to locate and geocode records in the CDS. The CDS uses

roadway information as the basis for locating crashes. Approximately 80% of crash records are matched to a location automatically. Through a combination of manual data editing processes from MassDOT Highway and RMV staff, input from regional planning agencies, and assistance from OTP, the match percentage increased to over 90%. However, the accuracy of crash location data depends on both the characteristics of the roadways (and the degree of difficulty in describing crash location due to the complexity of roadway geometry), and degree of precision by police in correctly providing and coding crash location information in their reports.

Traffic counts and pavement condition ratings are obtained on a three-year cycle, and this data is used to update the RIF on a continuous basis. While Massachusetts historically has used ortho-photography to verify the accuracy and completeness of road features and characteristics, the Commonwealth moved to use of a video log for ongoing verification activities of state-owned roadways.

## 2.3 DRIVER DATA SYSTEM

The RMV operates the Automated License and Registration System (ALARS). ALARS includes records for approximately five million commercial and non-commercial drivers. These records are created by the RMV but the MRB maintains operator driving history records consisting of at-fault accident claim records, comprehensive claim records, out-of-state incidents and civil and criminal traffic citation information.

The Massachusetts State Police (MSP) Office of Alcohol Testing manages testing for blood alcohol concentration (BAC). The results from breathalyzer tests conducted in the field are broadcast to the MSP every 90 minutes. The MSP relays the information to the RMV nightly, which enables the RMV to have current information on file and to take immediate actions on cases pending receipt of BAC test results.

In 2008, the RMV, the MRB and the Administrative office of the Trial Court (AOTC) worked together to develop an electronic interface between the district courts and the driver history file. Virtually all adjudication decisions are transferred electronically each night by AOTC to the MRB. This information is used to suspend or revoke licenses and to make adjustments in the insured's automobile insurance premium when applicable. This change closed a significant gap in communications and has substantially improved the process of using conviction data to suspend or revoke licenses and to adjust the insured's automobile insurance premium.

## 2.4 VEHICLE DATA SYSTEM

The RMV also manages vehicle title and registration information using ALARS, which contains approximately seven million commercial and non-commercial

registrations. The registrant is identified with a Massachusetts driver license number or an assigned non-driver identification number if the registrant is not a driver.

Registration applications must include an insurance agent stamp and signature. A Manufacturer's Certificate of Origin or a previous title also must be presented along with an odometer reading as part of the title application. Six to eight weeks are required for title processing. After receiving the registration document, plates and expiration decals, a vehicle safety inspection is required within seven days. Thereafter, annual safety inspections are required. Odometer readings are recorded in connection with safety inspections and any required emissions inspections.

Application for title must be done within 10 days of acquiring a vehicle or trailer unless the type of vehicle is exempt from titling. Information on a previous title may be acquired through the National Motor Vehicle Title Information System (NMVTIS) of the American Association of Motor Vehicle Administrators. Massachusetts is a full participant in NMVTIS enabling immediate electronic transactions with other NMVTIS States. Massachusetts also uses the Electronic Lien and Title (ELT) system. ELT enables direct interactions with lien holder institutions.

## 2.5 CITATION/ADJUDICATION DATA SYSTEM

The MRB is the sole repository for all Motor Vehicle Violation Citations issued in the Commonwealth. The MRB receives copies of motor vehicle violation citations from Massachusetts police departments and courts, and hearing requests and payments from violators and applies these records to an individual's driving history record.

Civil Motor Vehicle Infractions (CMVI) citations are sent directly to the MRB from the issuing police department. The MRB applies the citation to the violator's driving history record. The violator has 20 days from the date of violation to either pay the total amount due or to request a clerk-magistrate hearing. The payment or hearing request (accompanied by a $25.00 Court Filing Fee payment) is submitted to the MRB by the violator.

Requests for clerk-magistrate hearings along with a filing fee are processed and a file of hearing request records is sent via batch FTP transfer to AOTC. Upon disposition, AOTC transmits a file of hearing results records via batch FTP transfer to MRB. These results are uploaded to the RMV and processed, updating the operator driving history records with the submitted results. In calendar year 2014, the MRB sent AOTC 132,223 electronic CMVI hearing notices and AOTC sent the MRB 138,754 electronic hearing result records. Payments from violators are processed and the citation is adjudicated as responsible.

Multiple copies of a criminal citation are delivered to the court by the issuing police department. The court forwards a copy of the criminal citation to the MRB. The MRB applies the citation to the violator's driving history record. The court is responsible for conducting a hearing and rendering a disposition in a criminal matter. Upon issuance of a disposition, the court electronically submits the findings to the MRB. Upon receipt of the disposition, the MRB updates the citation record. The MRB also receives written warnings. Warnings, however, are not entered into driving history records.

While the exchange of criminal citation adjudication results and clerk-magistrate hearing requests and results between AOTC and MRB is now almost exclusively electronic, much of citation processing remains a paper-based process. This includes audit sheets, which are completed by officers to account for every citation, specifically citations that are destroyed or voided.

In 2014, the MRB in collaboration with the Administrative Office of the Trial Courts (AOTC) continued its efforts to streamline and improve the efficiency in the processing of criminal motor vehicle violation citations by working to add 43 Juvenile Courts and 14 Superior Courts to the electronic file transfer process to submit criminal traffic citation judgment records to the MRB. Testing was completed and all changes to MRB applications were migrated into the Automated License and Registration System (ALARS) production environment. Currently, all 43 Juvenile Courts are now submitting electronic records to the MRB. In 2014, 4 Superior Courts began submitting electronic records to the MRB, and in 2015 an additional 6 have been added and are submitting electronically with MRB. The MRB continues to work with AOTC to bring on the remaining Superior Courts.

The RMV/MRB is able to promptly suspend/revoke the driver license of individuals found guilty of criminal charges by these courts. These efforts rectify any lapses in updating driving history records and ensure future records are current and sanctions promptly applied.

## 2.6 INJURY SURVEILLANCE DATA SYSTEM

Injury surveillance includes the following systems:

• The Massachusetts Ambulance Trip Record Information System (MATRIS) – managed by DPH, this system collects Emergency Medical Services (EMS) trip information that complies with the National EMS Information System (NEMSIS) dataset;

• Case-mix Data - Hospital discharge, emergency department (ED) visit and observation stay data, collectively referred to as "Case-mix Data", are submitted by all Massachusetts acute care hospitals to the Center for Health Information and Analysis (CHIA). Relevant data include ICD-9-CM or ICD-10-CM diagnostic codes

for primary and secondary diagnoses (which describe the nature and body location of injuries and other conditions present), external cause codes or E-codes(which describe injury cause and MV person-type), patient demographics, visit dates, length of stay, discharge disposition and hospital charges.

• Trauma Registry – collected by DPH, all hospitals that treat trauma patients submit data on all trauma inpatient discharges, all trauma observation stays, and trauma ED visits for patients who die or are transferred from the ED; these data include patient blood pressure, respiratory rate, pulse, protective devices, airbag deployment, child specific restraints, cause of injury and location of injury ecodes, hospital based drug and alcohol test results, injury date, injury city, mode of transport to hospital, abbreviated injury scale (AIS), Glasgow coma scores, complications, and comorbidities. After submission by hospitals, DPH may add other fields such as geocoded census data and several survival probability metrics including revised trauma score, shock index, injury severity score, new injury severity score, and AIS-based trauma mortality prediction model using up to five worst injuries, ICD-9-CM-based trauma mortality prediction model, and an indicator for multiple injuries to the same body region. The system is being upgraded to include approximately 60 data elements to the current database including ICD-10-CM and AIS 2005/2008;

• Death Certificates – The Massachusetts Registry of Vital Records and Statistics collects certificates for all deaths that occur within Massachusetts as well as deaths of Massachusetts residents that occur outside of the Commonwealth. Relevant data include ICD-10 diagnostic codes for underlying and secondary causes of death (which describe injury cause, MV-person type, the nature and body location of injuries and other conditions present) patient demographics and date of death;

• Behavioral Risk Factor Surveillance System (BRFSS), Youth Risk Behavior Survey (YRBS) and Youth Health Survey (YHS) – These anonymous surveys collect statewide estimates on self-reported behaviors either annually (BRFSS) or bi-annually (YRBS and YHS). The BRFSS is a telephone survey administered to a sample of adult MA residents ages 18 and up. The YRBS and YHS are written surveys administered to a sample of MA public high school students, with the YHS also administered to public middle school students. Specific questions related to motor vehicle injuries include seat belt use (BRFSS, YRBS, YHS), riding in a car driven by someone who had been drinking alcohol (YRBS, YHS middle school), riding in a car driven by someone who had been smoking marijuana (YHS middle school), driving a car after drinking alcohol (BRFSS, YRBS,YHS), driving a car after smoking marijuana (YHS), talk on a cell phone while driving (YRBS), texting while driving (YHS), and texting or emailing while driving (YRBS). Responses can be broken down by respondent demographics or other risk behaviors.

# 3.0 Traffic Records Assessment

In December 2013, the National Highway Traffic Safety Administration (NHTSA) assembled a team to conduct a Traffic Records Assessment for Massachusetts. Congress has recognized the benefit of independent peer reviews for state traffic records data systems. These assessments help states identify areas of high performance and areas in need of improvement in addition to fostering greater collaboration among data systems. In order to encourage states to undertake such reviews regularly, Congress' Moving Ahead for Progress in the 21st Century (MAP-21) legislation requires states to conduct or update an assessment of its highway safety data and traffic records system every 5 years in order to qualify for §405(c) grant funding. This requirement was also included in Fixing America's Surface Transportation (FAST) Act.

This section includes the recommendations and considerations from the team and information about the initiatives being conducted in Massachusetts to address each of the recommendations. The Commonwealth's responses to the assessment recommendations in this section are bolded and underlined.

Many of the recommendations are still being reviewed and if they are accepted, performance measures that will be used to demonstrate quantifiable and measurable progress will be determined at that time. More detailed information about the recommendations and considerations can be found in the Traffic Records Assessment Final Report issued on April 14, 2014.

## Traffic Records Coordinating Committee Management

The 2014 Traffic Records Assessment did not have any recommendations but included the following considerations:

- Emphasis should be placed upon improving the data quality management of the driver system. The framework exists within the informal management system to develop and implement an effective comprehensive data quality management program.
- Efforts to continue to expand electronic submission of data should be explored and encouraged.
- Timeliness, accuracy, completeness, uniformity, integration, and accessibility performance measures along with the numeric goals (performance metrics) for each measure are the basis of quality determinations for driver data.

## Strategic Planning

The 2014 Traffic Records Assessment did not have any recommendations, but included the following considerations:

- Deficiencies and recommendations resulting from an evaluation conducted on the Crash Data Improvement Program (CDIP) will be incorporated into the 2015 Strategic Plan for Traffic Records Improvements. The state should be commended for taking this approach of using the traffic records assessment recommendations in developing and implementing their strategic plan. Additionally, the state should also be commended for including recommendations from the CDIP in future plan updates.
- Training and technical assistance needs can be presented to the TRCC for development and implementation. There appears to be no formal process for identifying and addressing technical assistance and training needs documented in the strategic plan. It is recommend the state be proactive and document a formal process to assess technical assistance and training needs instead of being reactive and having them identified in the assessment process or when they are presented to the TRCC.
- The strategic plan adequately documents the needs of all stakeholders. The strategic plan addresses coordination with key federal traffic records systems including FARS, NEMSIS and MCMIS. There was no evidence provided for coordination with the National Driver Register's Problem Pointer System (PDPS) and the Commercial Driver License Information System (CDLIS). It is recommended these two entities are incorporated into the state's coordination efforts.

## Crash System

The 2014 Traffic Records Assessment identified the following recommendations:

1. Improve the data dictionary for the Crash data system that reflect best practices identified in the Traffic Records Program Assessment Advisory Improve the procedures/process flows for the Crash data system that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation and the following considerations about the data dictionary are in the process of being reviewed.**

2. Improve the data quality control program for the Crash data system that reflect best practices identified in the Traffic Records Program Assessment Advisory. **The RMV Crash Records Department established a new Crash Data Reporting website on May 4, 2016. This website allows authorized users to view three data quality reports (Timeliness, Completeness and Reject/Resubmit). The Timeliness Report identifies the time frame crash reports are submitted to the RMV for retention, as required by law. This report calculates the time between a crash**

**occurrence and when that information is submitted (electronically) or entered (data entry) into the Crash Data System. The Completeness Report measures if there is a pattern to the required data elements that are missing from the crash report submitted by investigating officers as well as whether law enforcement agencies are investigating and reporting on all crashes that should be reported. The Reject/Resubmit Report displays the number of crash reports that did not meet the minimum criteria for acceptance to the Crash Data System. The report also displays the resubmission date and the number of days to resubmit, if applicable. The final column indicates whether the resubmitted report was accepted and processed into the Crash Data System or rejected again for incomplete data. In addition, monthly reports of these three categories will be automatically created and emailed to the designated contact at each police department for review and corrective action, if necessary. This project is listed in the FFY 2017 Highway Safety Plan under task TR-17-18.**

The 2014 Traffic Records Assessment identified the following considerations:

- Identify and implement edits necessary to achieve data consistency among all crash data systems. If necessary, as is likely the case, do this in incremental steps—taking several of the most significant areas of data errors first and establish a campaign to get information corrected on those items.

- Develop a crash manual and training materials for officers and supervisors to enable their optimum use of the crash reporting procedures and to correct the deficiencies known now and those that become known when changes occur in the future.

- Increase the use of electronic reporting to help increase the timeliness of the crash data.

- Develop an annotated process flow diagram showing the duration of each step in the crash data submission process, especially for paper reports, so that bottlenecks in the process can be identified and remedied.

- Scheduled discussions of data quality in TRCC meetings and include presentations of summary reports of data quality measurements.

- Performance measures should be created and designed to quantify the level of accuracy, completeness, uniformity, timeliness, data integration, and data accessibility that have been achieved. Performance measures for timeliness, completeness, and accuracy should also be produced at an agency level and shared with the TRCC and law enforcement agencies.

- Conduct regular reviews of a sample of crash reports. This can be performed on an agency basis and reports should be selected at random with a certain percentage represented from fatal, serious, moderate, and complaint injury levels. The results of the review should be shared with the TRCC and law enforcement agency. These results should be used to develop trainings and be compared over time to determine effectiveness.

- Continue to develop Filenet to store electronic images of crash reports for extended time periods and allow safety professional and engineers to have access to the images.

## Roadway

The 2014 Traffic Records Assessment identified the following recommendations:

1. Improve the applicable guidelines for the Roadway data system that reflect best practices identified in the Traffic Records Program Assessment Advisory. **The FHWA Model Inventory of Roadway Elements (MIRE) standards require statewide road inventories to include a specified set of Fundamental Data Elements (FDEs) for all intersections. These FDEs for intersections currently are not included in the Massachusetts roadway inventory. MassDOT is in the process of establishing a contract with Vanasse Hangen Brustlin, Inc. (VHB) to develop a template for collecting these FDEs. Central Transportation Planning Staff's project described in Section 5 will use VHB's data-collection template to collect FDEs for a set of approximately 5,500 intersections in Massachusetts. This will accomplish two goals towards improving the Massachusetts road inventory: (1) test VHB's data-collection template before it is used to collect data across the Commonwealth, thereby providing an opportunity to modify the template if necessary, (2) collect FDEs for a subset of the intersections in the Commonwealth. This pilot project is listed in the FFY 2017 Highway Safety Plan under task TR-17-17.**

2. Improve the data dictionary for the Roadway data system that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation and the following considerations are in the process of being reviewed.**

3. Improve the interfaces with the Roadway data system that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation and the following considerations are in the process of being reviewed.**

4. Improve the data quality control program for the Roadway data system that reflect best practices identified in the Traffic Records Program Assessment. **This recommendation and the following considerations are in the process of being reviewed.**

The 2014 Traffic Records Assessment identified the following considerations:

- Ideally states are encouraged to collect the Fundamental Data Elements (FDEs) of The Model Inventory of Data Elements (MIRE) for all public roads. These fundamental data elements are the basic roadway data elements recommended to be collected that a state can combine with crash data for analysis to identify safety problems and to make more effective safety countermeasure decisions for the Highway Safety Improvement Program (HSIP). It was unclear in the responses to this assessment as to the FDEs MassDOT collects and maintains in their Roadway Inventory. With respect to the Non-Fundamental MIRE data elements, no state DOT collects all, or nearly all MIRE elements for the Roadway Inventory file. It was difficult during this assessment process to determine the level to which Mass DOT collects the non-fundamental MIRE elements. It would be beneficial to conduct an assessment of the MIRE elements collected by MassDOT to the both the recommended MIRE FDEs and Non-Fundamental MIRE data elements. To assist with this effort, MassDOT may consider requesting a Roadway Data Improvement Program (RDIP) through the FHWA Division Office. Another option would be to request a Go-Team through NHTSA. The TRCC can assist with this. Either route will provide MassDOT with technical assistance to enhance their data collection capabilities and more efficiently collect uniform roadway data.

- Local agencies such as Metropolitan Planning Organizations (MPOs) often collect and maintain a wealth of roadway information. It was identified that different location methodologies are used by locals to collect data requiring MassDOT to customize the data to work with the various systems. It is critical to use compatible location methodologies to support the Roadway Inventory File and minimize the effort required to import local data in the state's enterprise roadway system.

- MassDOT has no formal or documented procedures in place to identify, prioritize or address data quality errors or issues. The overall quality of information in the Roadway system is dependent upon the GIS Services Validation report in addition to validation reports form FHWA's HPMS software for error/edit checking as data is entered into the statewide system. There was no schedule provided for the release of the validation

report or process used to provide feedback to the data collectors. It was also unclear as to whether priority is placed on critical data elements. Ideally, a formal process should be developed and errors identified through the validation process are shared with the data collectors and/or office providing the data. This could be accomplished through training sessions. The RDIP process or TRCC could be instrumental in assisting with this effort.

- Performance measures can provide the state a tool for helping assess data quality and establishing goals for data improvement. Ideally, performance measures for timeliness, accuracy, completeness, uniformity, integration, and accessibility should be established for the roadway system. Model performance measures for the six core data systems including Roadway can assist the state in developing performance measures and can be found at: http://www-nrd.nhtsa.dot.gov/Pubs/811441.pdf. As a follow-up to this publication, FHWA has also published guidance titled, Performance Measures for Roadway Inventory Data. MassDOT did not identify any formal or established performance measures for timeliness, accuracy, completeness, uniformity, integration and accessibility. MassDOT indicates that the Highway Performance Monitoring System (HPMS) requirements are met. With the wealth of data available through the MassDOT's roadway information and crash portals, it is possible to enhance the existing process to develop some of the performance measures. Formal metrics should be established to measure the performance. The state can use the documents mentioned above to assist in developing performance measures for Roadway Inventory Data or use the RDIP or Go-Team process. The TRCC can also assist in this effort.

## Driver

The 2014 Traffic Records Assessment identified the following recommendations:

1. Improve the applicable guidelines for the Driver data system that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation and the following considerations are in the process of being reviewed.**

2. Improve the data quality control program for the Driver data system that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation and the following considerations are in the process of being reviewed.**

The 2014 Traffic Records Assessment identified the following considerations:

- Emphasis should be placed upon improving the data quality management of the driver system. The framework exists within the informal management system to develop and implement an effective comprehensive data quality management program.

- Efforts to continue to expand electronic submission of data should be explored and encouraged.

- Timeliness, accuracy, completeness, uniformity, integration, and accessibility performance measures along with the numeric goals (performance metrics) for each measure are the basis of quality determinations for driver data.

## Vehicle

The 2014 Traffic Records Assessment identified the following recommendations:

1. Improve the data quality control program for the Vehicle data system that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation and the following considerations are in the process of being reviewed.**

The 2014 Traffic Records Assessment identified the following considerations:

- The main area for the improvement of the Massachusetts vehicle data system is within data quality control programs. To have greater ability to fully comprehend "how good" their vehicle data system is, the state may start working on a concept for a formal quality control program for the vehicle data system, which will include a formation of the timeliness, accuracy, completeness, uniformity, integration, and accessibility performance measures. Once established, such a data quality control program will be a great tool for data managers and data users to quickly and easily recognize logical further steps toward improvements. Similarly, the State should perform periodic independent sample-based audits to examine vehicle reports, use high frequency errors to create new training materials, and conduct periodic comparative and trend analyses to identify unexplained differences in data across years and jurisdictions. Finally, data quality feedback from key users should be regularly communicated to data collectors and managers and data quality reports should be created and provided to the state's TRCC committee for regular review.

## Citation / Adjudication

The 2014 Traffic Records Assessment identified the following recommendations:

1. Improve the interfaces with the Citation and Adjudication systems that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation is being addressed in FFY 2017. See the overview of the Citation/Adjudication Data System in Section 2.5 and the summary of the eCitation Project in Section 5.1 on page 5-20. This project is listed in the FFY 2017 Highway Safety Plan under task TR-17-04.**

2. Improve the data quality control program for the Citation and Adjudication systems that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation is being addressed in FFY 2017.See the overview of the Citation/Adjudication Data System in Section 2.5 and the summary of the eCitation Project in Section 5.1 on page 5-20. This project is listed in the FFY 2017 Highway Safety Plan under task TR-17-04**

The 2014 Traffic Records Assessment identified the following considerations:

- There is an opportunity for the state to develop and/or promote an electronic citation system. Such a system will increase the efficiency of the business processes associated with administering citations, and will result in more timely and accurate capture of the data.

- Some opportunities exist for improving linkages among various system components – such as adjudications with both the vehicle and crash files, which could improve the efficiency of vehicle-based administrative suspensions and revocations, as well as to increase the ability of the data in the system to support research.

- Those observations are opportunities to enhance the very positive strengths observed in the MA Citation/Adjudication system:

    - An outstanding integrated case management system for the courts that has received widespread acceptance and use.

    - Excellent use of electronic disposition reporting from the courts to the DMV, resulting in timely reporting of most dispositions.

- Good use of edit checks and validation rules to ensure data quality.

- Excellent use of traffic/criminal history and background information at the car, potentially improving data quality and efficiency of enforcement.

## EMS / Injury Surveillance

The 2014 Traffic Records Assessment identified the following recommendations:

1. Improve the interfaces with the Injury Surveillance systems that reflect best practices identified in the Traffic Records Program Assessment Advisory. **Updates are included below next to the considerations from the 2014 Traffic Records Assessment. Additional performance measures are currently being reviewed.**

2. Improve the data quality control program for the Injury Surveillance systems that reflect best practices identified in the Traffic Records Program Assessment Advisory. **Updates are included below next to the considerations from the 2014 Traffic Records Assessment. Additional performance measures are currently being reviewed.**

The 2014 Traffic Records Assessment identified the following considerations:

- Improve the utility of the death certificates database by improving the electronic reporting system to produce timelier data. **With the implementation of the new Electronic Death System in September 2014, Massachusetts has death information within days of death. This is a vast improvement over the paper based system previously used.**

- Use the validation score assigned by MATRIS to begin rejecting records with an unacceptable number of errors. **With the migration to NEMSIS V3 there is a new tool called Schematron that allows records to be rejected based on critical data errors. This tool will be leveraged with the guidance of the MATRIS Data Quality Workgroup and input from Injury Surveillance personnel. NEMSIS V3 has much more rigorous compliance standards for ePCR vendors that in Version 2. OEMS also plans to require the use of NEMSIS V3 compliant software to submit data to MATRIS which will contribute to more complete and uniform data. This project is listed in the FFY 2017 Highway Safety Plan under task TR-17-19**

- Increase the accuracy of the data in the trauma registry by creating an interface with MATRIS. **There are a number of methods to improve**

**accuracy of the data in both Trauma Registry and MATRIS planned for the next fiscal year and described in Section 5. Creating an interface between the two systems alone will not necessarily result in better data quality but is desired and is a consideration for future strategic upgrades as the health care industry moves toward HL7 and interoperability. This project is listed in the FFY 2017 Highway Safety Plan under task TR-17-04.**

- Develop an interface between the hospital databases and the vital records system. **This is not currently planned for FFY 2017, but it may be developed if funding becomes available.**

- Share data quality reports with the TRCC from all injury surveillance data systems with the TRCC. There is a data quality reporting tool in MATRIS and other state NEMSIS data collection systems that use the same vendor (ImageTrend) that was proposed and paid for by the New England states. **There is a data quality report available in MATRIS designed to help ambulance services review summary data in MATRIS and address discrepancies when compared to the data in their service ePCR software. OEMS leverages this tool to educate the ambulance services and monitor changes in quality. This could be run across all ambulance services for a year and shared after the information is aggregated/de-identified in accordance with DPH data privacy rules and approved for distribution. Development of annual reports from other injury surveillance data systems may be considered for feasibility and usefulness. This project is listed in the FFY 2017 Highway Safety Plan under task TR-17-04**

## Data Use and Integration

The 2014 Traffic Records Assessment identified the following recommendations:

1. Improve the traffic records systems capacity to integrate data that reflect best practices identified in the Traffic Records Program Assessment Advisory. **This recommendation is currently being address in the UMassSAFE project entitled "Investigation of Improved Linkage Strategy towards the Development of a Central and Uniformed Crash Analysis Database." Additional information about this project can be found in Section 5. This project is listed in the FFY 2017 Highway Safety Plan under task TR-17-07.**

The 2014 Traffic Records Assessment identified the following considerations:

- With support from the TRCC, the expertise and infrastructure is available in Massachusetts to take advantage of a number of opportunities related to data integration:
    - Coordinate efforts of MassTRAC and UMassSafe to maximize the use of data from the traffic records system components, both individually and collectively.
    - Pursue the re-inclusion of injury surveillance system data within the guidelines of the State's data committee.
    - Pursue the inclusion of driver and vehicle information in the MassTRAC or UMassSafe projects.
    - Complete the update of the Data Resource Guide to include information about the traffic records data systems and integration methodology.

# 4.0 Crash Data Improvement Program (CDIP)

In September and October 2013, the Federal Highway Administration (FHWA) Crash Data Improvement Program (CDIP) Technical Assistance Team (TAT) conducted a comprehensive data quality assessment of the Massachusetts crash data and recommended measures to improve the quality of the crash data reporting system. The CDIP is designed to help states develop and improve methods of assessing the quality of their crash data. The CDIP process examines the quality characteristics of timeliness, accuracy, completeness, consistency/uniformity, integration, and accessibility. The TAT uses a systematic approach to assess the crash data. Each step of crash data processing is examined because different personnel and agencies are typically responsible for collecting, processing, input, storing, and distributing crash data. The focus of the assessment was to establish performance measures (data quality metrics) which allow a State to assess how well each component of the crash data system functions. A summary of the recommendations follows, but more detailed information about each recommendation can be found in the Massachusetts CDIP Final Report submitted on November 8, 2013.

### Crash Data Processing Recommendations:

- Deploy the 2013 crash report revision. There should be a formal process for rolling out a new crash report form to law enforcement agencies.
- Work with law enforcement agencies and records management system (RMS) vendors to achieve electronic submission of the approximately 20% of crash reports that are in agency RMSs but are currently submitted on paper.
- Develop and market a plan for achieving 100% electronic crash report submissions.
- Monitor progress toward achieving 100% electronic reporting and share the information with the TRCC and NHTSA. Fund a dedicated IT resource person to the crash reporting system to be responsible for CDS support, interaction with the LEAs and RMS vendors, and development of the data quality queries identified in this report. This dedicated IT resource person should also be tasked with programming the data quality analyses recommended throughout the remainder of this report.
- Work with law enforcement agencies, the chiefs of police association, and other stakeholders to share information on the capabilities and best practices in law enforcement data collection and records management. Consider

sponsoring an annual vendor showcase and state-of-the-practice conference for law enforcement decision makers.

- Establish a vendor certification process in the RMV to identify those vendors meeting minimum crash data quality and submission standards.
- Invest in the Motor Vehicles Automated Citation and Crash System (MACCS) as a modern front-end to the crash data system. Capabilities to consider implementing in MACCS include edit checking of *all* submitted crash reports, replacement of the data entry functions of CDS for all paper reports, RMV driver and vehicle validation, roadway data validation, and advanced analysis and data extraction.
- Establish a stakeholder group, preferably through the TRCC, to ensure that the MACCS product meets the needs of data collectors, managers, and users. This group must include active IT support.
- Develop a Crash Records Business Plan to address all the deficiencies and recommendations presented in this report and/or identified by MassDOT and the TRCC.

## Crash Location Process Recommendations:

- Update the MassDOT reference map and establish a location reference maintenance process.
- Redefine location information edit checks as fatal errors whenever required data are missing from the crash report. Track correction and resubmission of these reports and establish a standard for the time from rejection to resubmission of the corrected reports.
- Develop a single smart mapping locator tool that could be called from any of the eCrash software products used by law enforcement agencies. Data Quality Assessment Recommendations
- Establish the data quality measurements developed by MassDOT Highway Division staff, as the routine data quality metrics for use by the crash data system managers. These reports should be automated in order to avoid over-burdening the RMV or Highway Division staff.
- Invest in training and software tools for RMV staff to develop their own data quality measurement reports.
- Establish the remaining components of a formal, comprehensive data quality management program. The Technical Advisory Team recommends that MassDOT prioritize the standardization of edit checks for crash report submission and the processes for returning and tracking rejected reports. The next level priorities should be to establish numeric goals for data quality and to provide routine feedback to LEAs on their data quality performance.

## Timeliness Recommendations

- Establish routine measures of overall crash data timeliness.
- Produce routine reports of the timeliness of crash data submissions aggregated for each law enforcement agency. Share the reports with the law enforcement agencies along with a comparison to the statewide average.
- Establish a measurement of the timeliness of correction and resubmission of rejected reports by each law enforcement agency. Share this report with the law enforcement agencies and show the comparison to the statewide average.
- Produce annual measures of crash production processes (data entry and location coding).

## Accuracy Recommendations

- Implement error logging in MACCS. This would require tracking of which edit checks were failed and what corrections were made to any database field in each crash report.
- Establish the geolocation success rate as a measure of crash location data accuracy.

## Completeness Recommendations

- Expand the analyses produced by the Highway Division to provide aggregate measures of missing data and year-to-date crash report submissions for each law enforcement agency.
- Establish a plan to address under-reporting by large local law enforcement agenices.
- Ensure adequate IT support is in place at the RMV to assist local law enforcement agencies in resolving data submission problems.

## Uniformity Recommendations

- Conduct the ratio analysis of fatal+injury/total crashes on a routine basis aggregated for each law enforcement agency. Share the analysis with the law enforcement agencies along with a comparison to the statewide average.

## Integration Recommendations

- Produce routine measures of crash data integration based on (a) percent of crash records linked with roadway inventory and traffic data; (b) successful

matching of crash-involved drivers and vehicles to ALARS; and (c) persons injured in crashes and any of the injury surveillance databases (EMS, trauma, etc.).

- Invest in a CODES-like probabilistic linkage between crash and injury surveillance data (in particular EMS and trauma registry data) under the leadership of the Department of Public Health (DPH).
- Consider development of a unique incident identification number to be applied to all reports (crash, EMS, etc.).

## Accessibility Recommendations

- Develop routine measures of crash data accessibility based on the MassDOT request-tracking database and use of the public Crash Portal.
- Plan for enhancements that will be needed in the public Crash Portal. MassDOT should first develop an online user satisfaction survey to be implemented on the portal.

# 5.0 Traffic Records Projects

This section lists the projects that are being planned for FFY 2017 and the completed traffic records projects since the development of the 2005 Strategic Plan. This section includes projects funded through the Traffic Records Program as well as other sources of funding. This section also provides the criteria used for project selection as well as information on the anticipated performance impact (i.e., improvements in accuracy, timeliness, accessibility, completeness, data integration, and uniformity) of the planned projects. Below is a list of performance targets for FFY 2017:

Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.

Traffic Records Performance Target #2 To improve the integration of traffic records systems by increasing the number of linked crash reports to hospital inpatient records by 10% from 91,000 in 2007 to 100,100 by September 2017.

Traffic Records Performance Target #3 To increase by 5% the number of agencies able to access MassTRAC from 160 in April 2016 to 176 in June 2017.

Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

Traffic Records Performance Target #5 To improve completeness of the Massachusetts emergency medical services (EMS)/injury database, the Massachusetts Ambulance Trip Record Information System (MATRIS), by increasing the validation score from 83.64 in March 2016 to 87 in March 2017. (As of June 2016 the average score for the last 90 days system wide is 87).

Traffic Records Performance Target #6 To improve the completeness of the Massachusetts statewide road inventory database by increasing the number of intersections with Fundamental Data Elements from 0 in FFY 2016 to 5,400 in FFY 2017.

## 5.1 FFY 2017 PROJECTS

This section describes the new projects to receive FFY 2017 funding and the current projects that will continue through FFY 2017. This section also describes projects and actions related to traffic records, regardless of the source of funding, that Massachusetts has undertaken since the development of the 2005 Strategic Plan.

- **Boston Cyclist, Pedestrian and Vehicular Incident Information System Enhancement -- (Highway Safety Plan Task TR-17-16)**
  Boston EMS
  Budget: $156,937 (NHTSA, Section 405c)

  Boston EMS is the provider of emergency medical services for Boston. In 2014, their team of highly trained EMTs and Paramedics responded to over 120,000 clinical incidents and transported over 83,000 patients to area hospitals. They are the largest municipal provider of EMS in New England and one of the busiest services in the country. Boston EMS strives to improve access to healthcare across the city and provide all patients with the best pre-hospital emergency care in the country.

  Of the incidents Boston EMS responded to in 2014, approximately 555 were for cyclist incidents, 724 were for pedestrian incidents and over 3,700 were for motor vehicle accidents. Both cyclist and pedestrian incidents showed a decline from the year prior. Although changes in weather and precipitation can impact ridership and consequently the number of incidents, 2014 represents the first year, since they have begun analyzing this data, where such incident counts dropped. Boston EMS is confident that the City's commitment to roadway safety has contributed to these improvements. Over the next year, Boston EMS will expand upon the existing Traffic Safety projects to further enhance EMS roadway incident analysis and reporting, including the development of another multi-year report and more frequent public reporting. The Boston Cyclist, Pedestrian & Vehicular Incident Information System Enhancement project was developed to respond to a significant opportunity for Boston EMS to address information gaps, inconsistent data gathering and analysis and the lack of usable real time data to guide decisions on traffic safety and transportation policy in Boston.

  This project is essential for continued investment in EMS roadway incident data analysis, improvement upon systems development and reporting, as well as the upcoming focus on information sharing.

Specific project activities are below:

Project Management and Coordination: A Boston EMS paramedic will serve as the project lead, ensuring all deliverables are met and taking responsibility for validating the project's key data components.

Data Vetting: Boston EMS will continue to monitor and vet every roadway incident to ensure the data sets have the most accurate data.

Data Analysis Reporting: Development of timely reports to meet the unique needs of the intended audience. This will be done through systems development of the GIS dashboard tool, stakeholder engagement and data review.

Training of EMS personnel to support system enhancements: In the course of regular in-service trainings, all EMTs and Paramedics, along with relevant support and managerial staff, will be updated on the project. Additionally, Boston EMS will invest in training and professional development of project staff to optimize in-house capabilities for best addressing the project goal and deliverables.

This project will support the following performance targets:

- Traffic Records Performance Target #2 To improve the integration of traffic records systems by increasing the number of linked crash reports to hospital inpatient records by 10% from 91,000 in 2007 to 100,100 by September 2017.
- Traffic Records Performance Target #5 To improve completeness of the Massachusetts emergency medical services (EMS)/injury database, the Massachusetts Ambulance Trip Record Information System (MATRIS), by increasing the validation score from 83.64 in March 2016 to 87 in March 2017.

- **Test the Template Developed by Vanasse Hangen Brustlin, Inc. (VHB) for Collecting Model Inventory Road Element (MIRE) Fundamental Data Elements (FDEs) for Intersections on a Subset of the Intersections in Massachusetts -- (Highway Safety Plan Task TR-17-17)**
  Central Transportation Planning Staff (CTPS)
  Budget: $96,732 (NHTSA, Section 405c)

  The Federal Highway Administration (FHWA) considers the presence of a traffic control device at an intersection and the device's type, if one is present, as Fundamental Data Elements (FDEs) of a Model Inventory of Roadway Elements (MIRE). (This is documented in the FHWA's Guidance Memorandum on Fundamental Roadway and Traffic Data Elements to Improve the Highway Safety Improvement Program - August 1, 2011.) The Massachusetts statewide road inventory currently does not contain the required FDEs for intersections. MassDOT is entering into a contract with

Vanasse Hangen Brustlin, Inc. (VHB) to develop a template to be used to collect these FDEs so that they can be added to the Road Inventory. This project will use the VHB template to collect FDEs for a subset of the intersections in the state and evaluate the template. This will allow the template to be modified, if deemed necessary or advisable, before it is used to collect FDEs for intersections statewide.

This project has four parts:

- Collect Fundamental Data Elements (FDEs) of Model Inventory or Roadway Elements (MIREs) at approximately 5,400 intersections that are believed to be signalized.
- Collect FDEs at approximately 100 intersections selected by MassDOT Traffic and Safety Engineering that are believed not to be signalized.
- Investigate methodologies for automatic collection of traffic signal data from the Crash Data System.
- Collect data on municipal traffic signals from the cities and towns in Massachusetts from which CTPS has not yet obtained this data, and compile it into a GIS database.

This project will support the following performance target:

- Traffic Records Performance Target #6 To improve the completeness of the Massachusetts statewide road inventory database by increasing the number of intersections with Fundamental Data Elements from 0 in FFY 2016 to 5,400 in FFY 2017.

- **Data Quality Review of Crash Reports Accepted with Warning and Technical Assistance to Police Departments to Improve Completeness and Reduce Errors -- (Highway Safety Plan Task TR-17-18)**
  RMV
  Budget: $196,802.46 (NHTSA, Section 405c)

  A review of crash reports submitted to the RMV for the period of 2012 to 2014 found that 17% of crash reports have been accepted without warning, 72% accepted with warning and 11% rejected and sent back to police departments for further information. Currently, the RMV is developing methods for tracking crash reports that have been rejected and determining whether those reports were resubmitted. However, further review is needed of the 72% of crash reports that are accepted with warning.

  In order to reduce percent of crash reports accepted with warning and thus improve the completeness of crash data, the RMV Division and UMassSafe propose to conduct a quality control review of crash reports submitted by local and state police that are accepted by the RMV Division with warnings, in order to define what problems exist, and then work with police departments to address those problems.

Specifically, fields that are problematic for all crash reports accepted with warnings will be studied as well as those for individual police departments and/or Record Management Systems (RMS). These findings will be used to rank both police departments and RMSs, as well as to provide guidance and technical assistance to police departments in improving the data. These efforts are intended to reduce the percent of crash reports accepted with warning.

The goal of the project is to reduce the percent of crash reports that are accepted with warning from 72% to 60% in the first year, and a reduction to 50% by the end of the second year following the award; thereby improving the rate of completeness and accuracy of crash reports submitted by law enforcement agencies.

This project will support the following performance targets:

- Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.
- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **Data Uniformity, Accuracy, Completeness and Timeliness -- (Highway Safety Plan Task TR-17-19)**
  DPH
  Budget: $180,000(NHTSA, Section 405c)

  MATRIS is currently based on the National EMS Information System (NEMSIS) Version 2 data set standard developed in 2005. MATRIS must migrate to the new standard as NEMSIS will no longer collect Version 2 data after 2016. The electronic patient care report (ePCR) vendor software used by ambulance services to collect and submit data to MATRIS will be migrated to the new version in the next year. DPH will need to upgrade the software platform and build out a new server. Funding will be used to expand and improve upon a process highlighted by the South Shore Hospital using MATRIS as a central location to access trip records and perform quality assurance/quality improvement reviews for 10 ambulance services. The Trauma Registry (as well as all entities covered by the Health Insurance Portability and Accountability Act) must transition from the International Classification of Diseases version 9 to version 10. Funding will also be used for coordination and training with

hospitals and vendors. Additional information about the system can be found in the summaries for the next two projects: "Trauma Registry Vendor and Database Hosting Upgrades" and "MATRIS and Trauma Registry Data Accuracy, Completeness, Uniformity and Accessibility."

This project will support the following performance target:

- Traffic Records Performance Target #5 To improve completeness of the Massachusetts emergency medical services (EMS)/injury database, the Massachusetts Ambulance Trip Record Information System (MATRIS), by increasing the validation score from 83.64 in March 2016 to 87 in March 2017.

- **Trauma Registry Vendor and Database Hosting Upgrades -- (Highway Safety Plan Task TR-17-15)**
  DPH
  Budget: $60,000 (NHTSA, Section 405c) and $575,000 (State funding)

  The State Trauma Registry data has been collected since 2008. The submissions occur quarterly using the federal fiscal year as the time frame (Oct 1st to September 30th). The national standards have changed over the last eight years with emphasis being placed on quality improvement. There are substantial coding schema changes associated with the conversion from ICD – 9 – CM to ICD – 10 – CM. The current registry system is set up to only accept up to the 1998 version of the Abbreviated Injury Scale (AIS) due to the need for a license to use AIS version 2005/2008.

  The changes required to enhance the current processing workflow (upload, edit, process, and report back to the hospitals) is extensive for a small vendor to build and maintain. These changes require a specific-system build for trauma data that would be maintained by the trauma registry staff which includes all the national standards updates and quality improvement initiatives. The current vendor's system will need to handle the enhancements that the Department of Health and Human Services and Office of Emergency Medical Services (OEMS) requires (ICD-10, AIS 2005/2008 inclusion) in the upgraded system. These changes in the collection of the trauma data are making the OEMS reevaluate the current system and working with the vendor to upgrade the system.

  The State Trauma Registry will be working with the EOHHS Procurement Team to maintain the vendor relationship. The EOHHS PMO is charged with creating and maintaining a formal process methodology for application project management and deployment, which includes requirements and system documentation, software application implementation, and ensure the Commonwealth and Federal security, accessibility, performance, and regulatory standards are in compliance with the Section 508 Standards for Electronic and

Information Technology Accessibility issued under Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794 (d)) (the "Section 508 Standards") and the Web Accessibility Standards issues by the Commonwealth of Massachusetts' Information Technology Division.

Mass IT will be responsible for hosting the database for the Bureau of Health Care Safety and Quality. The State Trauma Registry will be working with both the EOHHS Procurement Team and MASS IT to make sure the hosting site build requirements are correct and the data transfer into the hosting site is transparent. The hosting services will be for the full Trauma Registry Database that may hold the data from 2008 – 2015 and 2015 – onward with the greatest change being the ICD – 9 – CM and ICD - 10 – CM diagnostic codes. The database will need to meet the Mass IT compliance requirements to reside in the host site.

In addition, the State Trauma Registry will be working with both the EOHHS Procurement Team and HSN to develop a separation plan that will allow the State Trauma Registry database to move from the servers that contain the HSN data to a host site dedicated to the trauma registry. This move will involve the assistance of Mass IT to determine the timeline and set the database format for consistent data transfer between the vendor and Mass IT.

The American College of Surgeons has changed their data submission requirements for the trauma centers. As a part of the National Trauma Data Bank (NTDB)/Trauma Quality Improvement Program (TQIP) requirements, the trauma centers must submit the AIS 2005/2008 data starting in January 1, 2016. The ICD-10-CM coding is a federal and NTDB requirement for data submission starting in October 2015 with the NTDB not accepting ICD-9-CM coding starting in January 1, 2017.

This project will support the following performance target:

- Traffic Records Performance Target #5 To improve completeness of the Massachusetts emergency medical services (EMS)/injury database, the Massachusetts Ambulance Trip Record Information System (MATRIS), by increasing the validation score from 83.64 in March 2016 to 87 in March 2017.

- **MATRIS and Trauma Registry Data Accuracy, Completeness, Uniformity and Accessibility -- (Highway Safety Plan Task TR-17-11)**
  DPH/OEMS
  Budget: Year 1 - $270,200 and Year 2 - $346,200 (NHTSA; Section 405c)

  Massachusetts made great progress after the inception in 2010 with efforts to increase participation by EMS services and providers submitting to MATRIS. Efforts are now on better dissemination and improved uses of this valuable information. Massachusetts OEMS has been able to increase the number of services participating by working with both small services utilizing direct entry

methods as well as larger sophisticated services utilizing commercially available ePCR systems. These efforts have yielded many more requests for aggregated data and reports so that services, physicians and hospitals have capabilities to benchmark and measure system performance.

These increased and more detailed requests from the healthcare community have initiated efforts to generate routine reporting systems that may better satisfy many of our data and report requests. OEMS has been working with hospital staff, EMS professionals and physicians to develop better reporting, validation and data dissemination to satisfy this growing data appetite. This will apply to the MATRIS project, the Trauma Registry and combined system reporting to these stakeholders.

Annually requested data has been provided to the Massachusetts Department of Transportation (DOT) each year since 2013 for the Motorcycle Safety Rider Education Program and for the Bicycle and Pedestrian Safety Program where the data is one of a number of sources used to determine which towns receive funding.

A package of descriptive measurements was developed and is compiled each month with information on ambulance services' timeliness, completeness and quality of data submission along with information on the ePCR software used by each service.

Massachusetts has not yet begun submitting data to the NEMSIS Technical Assistance Center repository but is working with NEMSIS. Technical resources have tested the data submission process and verified that the data will be accepted and the NEMSIS TAC is currently working on the IRB application to allow Massachusetts to submit MATRIS data to the NEMSIS repository. The effort will continue to address the completeness and uniformity of the data to improve the percentage of records eligible for posting to the NEMSIS repository.

A data advisory board consisting of ambulance service providers, a trauma doctor and an ePCR software representative was created in the fall of 2013 to identify processes to obtain and improve consistent comprehensive data accuracy; resources were leveraged to coordinate and prepare for the board meetings and perform follow up. A full review of validation rules was performed by this group and the recommendations will be incorporated in NEMSIS V3. This group will be leveraged for guidance on the migration to NEMSIS V3.

The personnel continue to implement necessary software and infrastructure enhancements to ensure data uploaded via ePCR's is accurate and complete. The resources have reviewed motor vehicle crash data, bicycle and pedestrian incident data when preparing data for the MA DOT and addressed data quality issues with specific ambulance services and software vendors to improve the data quality.

The projects address the following recommendations from the 2009 Traffic Records Assessment:

- "Continue to promote and implement MATRIS": This project includes quality assurance validation of the MATRIS data, accessibility of reports to stakeholders. It will result in the ability to make a contribution providing data to support the goals of the Strategic Highway Safety Plan. It will enable submission of MATRIS data to NEMSIS at the national level and by converting to the new NEMSIS 3 standard, ensure consistency with the national standard and enable capturing more robust data with improved granularity and specificity. The NEMSIS 3 platform will also provide better validation processes and business rule functionality to improve the quality and uniformity of the data.
- "Continue to grow and promote the trauma registry": This project results in the validation of the State Trauma Registry data and development and dissemination of reports from the system. The data reporting will include benchmarking and monitoring trauma care. This project also results in the conversion to the national coding standard ICD-10-CM, AIS 2005/2008, enhanced data elements consistent with the National Trauma Data Bank(NTDB), and updated validation edits. "Complete data sharing agreements so that State agencies will be able to access integrated crash and injury data": With the validation of the MATRIS and Trauma Registry data and completing the agreements to submit data to NEMSIS the framework will be expanded to enable additional data sharing agreements to other agencies. The Injury Prevention and Statistics team has an agreement in place, renewed annually, and began analyzing MATRIS data in 2013.

  The continuing projects above are funded by the NHTSA 405C grants through the TRCC and the CDC Preventative Health and Human Services Block Grant. The funds estimated to perform these going forward includes $60,000 in NHTSA 405C funding and $220,000 from the Block Grant.

This project will support the following performance target:

- Traffic Records Performance Target #5 To improve completeness of the Massachusetts emergency medical services (EMS)/injury database, the Massachusetts Ambulance Trip Record Information System (MATRIS), by increasing the validation score from 83.64 in March 2016 to 87 in March 2017.

- **Massachusetts Revised Crash Report Form E-Manual and Evaluation (Highway Safety Plan Task TR-17-14)**
  UMassSAFE
  Budget: $118,019 (NHTSA, Section 405c)

  This project has two tasks: (1) develop the Massachusetts e-manual for crash reporting information and (2) evaluate of revised Massachusetts crash report fields.

  The intent of Task 1 is to improve the efficiency, accuracy, and completeness of the Massachusetts crash reporting process. UMassSafe will develop a web based, interactive crash report manual that would function like a toolkit with tabs for different information and links for further information. The Toolkit would include information on the following crash related information:

  - Why we investigate crashes and how crash data is used
  - General crash report information
  - Data dictionary
  - Coding guide
  - Specific information on new crash report fields
  - Directions for each section of crash report (person, crash, location, and diagram
  - Validation rules (if available from MassDOT RMV Division)

  The manual will be shared will all state agencies and other traffic records partners. The E-Manual will be posted on the UMassSafe web site as well as the Commercial Vehicle Toolkit Web Site (cmvtoolkit.ecs.umass.edu).The information will be provided with an easily accessible manual that will be available online, offline as a flat document, and a summarized printed version. The crash manual would only need updating if the Massachusetts crash report is modified and then only minor updates (ex. definition of new field) would be necessary therefore, sustainability of the project after Section 405C funding is complete, is not a problem.

  In January of 2013, a revised crash report form was released for implementation across the Commonwealth. Since the implementation of the new form, current usage and problems are undocumented. Task 2 would examine all fields affected by the changes, to look for problematic patterns existing at both the department and vendor levels. The identified issues will be categorized into system problems (ex: vendor/department still using old version) or quality issues (ex: inconsistences that exist within the use of the new fields). Additionally, during the conversion, older crash data housed in CDS was converted to the new schema without clear documentation or procedure; variables that no longer exist are now coded improperly.

  The aim of this task is to assess the usage of the new crash report fields. Analysis will be completed at varying levels including police agency, vendor and

statewide. An initial analysis will assess the overall successful implementation of the new fields. Problematic fields identified here will then be used to search for other correlating trends. Police agencies will be ranked on the completeness of varying fields; their overall completeness will serve as a baseline for comparison of the fields of interest.

This evaluation will provide needed information on any existing problems with new/modified fields as well as any corrections or needed training. Furthermore, documentation of the challenges will be useful for users of the crash data, to properly disclaim how the data is affected and which precautions should be used in future analysis utilizing the modified old data. All findings will be shared with the TRCC, as well as any state agencies and other traffic records partners.

This project will support the following performance targets:

- Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.
- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **Crash Data Audit - An Investigation of Police Crash Reports to Establish and Assess Current Obstacles and Future Performance Measures & Monitoring (Highway Safety Plan Task TR-17-12)**
  University of Massachusetts Traffic Safety Research Program
  Budget: $123,648 (NHTSA, Section 405c)

  In order to improve crash data quality, UMassSafe will conduct a quality control review via a crash data audit, investigating police crash reports and thereby establishing and assessing current obstacles and future performance measures and monitoring criteria. Assessed in this audit will be the timeliness, accuracy, consistency and completeness of the crash report.

  A Massachusetts crash data audit of 2001 police crash reports (old crash report form) was conducted by Data Nexus, followed by a 2005 crash data audit of police crash reports conducted by UMassSafe to assist in identification of incorrect or incomplete fields, or those resulting in poor data. With this project, UMassSafe proposes will another crash data audit, as recommended in the 2014 MA Traffic Records Assessment.

  The methodological approach employed would be consistent with the approach previously used for the 2001 and 2005 crash report audits. The audit will include both paper and electronic crash reports submitted by local and State police, with

the most recent closed year of crash reports used. In addition, the audit will include an examination and comparison of both individual reports and the master record for each crash.

With more than 100,000 crashes reported by police in Massachusetts each year, it is impossible to examine every crash report; however, a random sample of crash reports will be selected. To ensure that the sample size selected is large enough to produce significant results, the sample size selection will be based on a 90% confidence interval and a "worst case scenario" error. The "worst case scenario" accounts for the greatest margin of error possible; it is the most conservative scenario for selecting sample size.

Similarly to the audit of 2005 crash reports, the audits will be conducted by teams of two, most often a representative from UMassSafe paired with a representative from another agency – local police, state police, MassDOT RMV and MassDOT Highway Division. An overview of the audit process as well as a demonstration will be provided for the auditors. In addition, a sample review will be conducted by each audit team, followed by a thorough discussion about the results, ensuring that all reviewers understand the process and the level of detail expected in the review process.

The crash, location, vehicle and non-motorist sections of the crash report will be examined. Within each section, auditors will determine whether the responses recorded on the crash report are: a) Acceptable, b) Inconsistent, c) Invalid, or d) Empty. Each team will review a subset of crashes in the sample for accuracy, which in the context of this audit refers to valid data in terms of internal consistency and completeness. Internal consistency indicates that the report's description of the crash, the vehicles and the people involved contains no contradictory information. Completeness indicates that the report contains the minimum information required and that the data is acceptable. Minimum information required indicates that all relevant fields have been completed with a valid response/value, and that in addition, the narrative and diagram are completed. The level of detail associated with these sections will be reviewed individually by auditors. Finally, a review of the timeliness of crash report submittal will be conducted.

Cross-checks will involve a secondary review of a subsample of all crashes included in the individual reviews. A different auditor will conduct the secondary review of the report to ensure not only that all panel members are using the same criteria for reviewing crash reports, but also to determine whether selected portions are in need of a complete second review. UMassSafe staff will then compare and examine the cross-checks and resolve differences between reviews.

Once the audit process is complete, the records for each of the reports included in the sample will be compiled into one database and queried to identify two

categories of information for each field, including a percent distribution for the four categories (acceptable, inconsistent, invalid or empty) and a list of comments/notes included by the auditors. These details can be used as performance measures for timeliness, accuracy, consistency and completeness.

Findings will be presented to the TRCC along with other key stakeholders via a final report and presentation, followed by a facilitated discussion and the development of a set of crash report improvement recommendations and a Police Crash Report Data Quality Improvement Plan. The audit findings will be utilized to develop performance measures for future improvements and recommendations for next steps.

UMassSafe has conducted similar audits for the Massachusetts State Police (MSP) on commercial motor vehicle (CMV) crash data in various databases. The findings of these audits were used by the MSP and UMassSafe to provide technical assistance to selected police departments through the development of law enforcement resources; including a CMV crash reporting guide and web based toolkit and a classroom and online CMV crash report training. The findings continue to be used to assess progress and plan future programming.

The goal of the project is to conduct an investigation of crash reports to establish and assess current obstacles, future performance measures and monitoring strategies. The findings will be used to develop a Police Crash Report Data Quality Improvement Plan.

This project will support the following performance target:

- Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.
- Traffic Records Performance Target #2 To improve the integration of traffic records systems by increasing the number of linked crash reports to hospital inpatient records by 10% from 91,000 in 2007 to 100,100 by September 2017.
- Traffic Records Performance Target #3 To increase by 5% the number of agencies able to access MassTRAC from 160 in April 2016 to 176 in June 2017.
- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **Crash Data System Stakeholder Data Improvement Project -- (Highway Safety Plan Task TR-17-09)**
  RMV
  Budget: $168,907 (NHTSA, Section 405c)

  The RMV is currently in the process of designing a new mainframe database to replace the aging one now in operation ALARS. The present CDS is a stand-alone database, which was not included in the plans to incorporate current RMV transactions into the new database, due to limitations on funding. This project is intended to position the CDS for future incorporation into the new database by defining the optimum CDS. This means working with stakeholders to identify needs and assess the potential for data linkages and exchange, including what is possible through the EOPSS MACCS project currently in development. In the event that a decision is made that all RMV crash data will flow through the Criminal Justice information System (CJIS), there are no state staff or funds available to perform the work to accomplish that at this time.

  Phase I entails developing the business model which defines the crash data process. Phase II entails developing the interface specifications for the data exchanges to and from CJIS.

  The 2009 Traffic Records Assessment states that the Commonwealth is facing serious challenges in its attempts to provide crash data to users throughout the highway safety community. The report describes the crash file as "unreliable" in its current state as a data source to drive policy setting and program planning. Among the problems cited is the lack of edits applied at the time reports are data-entered, and reliance on operator reports in the absence of a crash report submitted by police. This project is intended to design a new crash data system to address many of the specific recommendations from Section 2A of the report, under "Crash Records" to include:

  - Develop a comprehensive plan to improve crash data to acceptable levels (by the end of 2010) and obtain Executive-level endorsement of the plan, up to and including the Governor, if necessary, to ensure that all law enforcement agencies meet their reporting requirements under the law
  - Include in the plan a timeline to gradually eliminate the need for operator reports in the CDS
  - Expand the edit checks in CDS for manual data entry to a set that is operationally meaningful, establishes a high standard for data quality, and meets with the approval of the TRCC members
  - Establish a formal quality control program with operationally meaningful measurements, a tracking system that ensures reports containing serious errors are returned to the law enforcement agency for correction, and are subsequently returned to the RMV in a timely fashion. Track all errors and use the information to develop additional content for crash reporting training and refresher training

- Ensure that crash report images (including the narrative and diagram) are available for all crashes to legitimate users of the crash data, especially those who rely on accurate location information

The project goals are to:

- Develop the business model which defines the crash process and system
- Develop interface specifications for crash data exchange between the RMV and other crash data stakeholders

This project will support the following performance target:

- Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.
- Traffic Records Performance Target #2 To improve the integration of traffic records systems by increasing the number of linked crash reports to hospital inpatient records by 10% from 91,000 in 2007 to 100,100 by September 2017.
- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **Crash Reporting Training and Technical Assistance for Law Enforcement Agencies -- (Highway Safety Plan Task TR-17-13)**
  Fisher College - Center for Leadership in Public Service
  Budget: $81,272.65 (NHTSA, Section 405c)

  Current quality assurance projects are underway to work on developing quality measures and processes on the backend of the data collection. There are, however, still a number of law enforcement agencies that struggle to submit their crash data to the RMV. The project is designed to provide training and technical assistance to law enforcement agencies in order to assist and improve the accessibility, timeliness, accuracy, completeness, integration, and uniformity of their crash data reporting. The goal is to improve the data received by the RMV.

  Fisher College will partner with the Massachusetts Association of Crime Analysts (MACA) to provide this technical assistance to local law enforcement agencies throughout the Commonwealth. MACA has approximately 200 members representing about 140 law enforcement agencies. MACA also has the most certified law enforcement analysts of any regional association in the United States.

Although MACA is an association of crime analysts, many of its members although conduct traffic analysis, including but not limited to Data-Driven Approaches to Crime and Traffic Safety (DDACTS). These analysts use and are very familiar with the same record management systems that are utilized for collecting and storing crash data.

Results from a current project using three years of crash data showed that law enforcement agencies in Massachusetts use one of six vendors for their record management systems with IMC, QED, and Pamet accounting for approximately 85% of all crashes reported for that timeframe. This clearly indicates that there is a case for improving crash reporting to the RMV by providing training and technical assistance to law enforcement agencies that might not have the resources and capabilities that other agencies have using the same exact record management systems.

Fisher College will only be involved in the developing a survey to assess training and technical assistance needs as well as the project and grant management. All training and technical assistance will be performed by MACA members selected by the Training Coordinator provided by MACA. Criteria to be used will include proximity to law enforcement agency in need and expertise in the record management system to be used. The fact that training and technical assistance are conducted by fellow law enforcement personnel should encourage law enforcement agencies to participate in the program. Key deliverables are:

- Developing and analyzing a survey of law enforcement agencies as to their crash reporting status, capabilities, technical platforms, training and technical assistance needs.
- Targeting local law enforcement agencies with one site visits conducting training and technical assistance via selected MACA members to address working with record management systems and submitting crash data to the RMV.
- Assessing impact of the program on quality of crash data submitted to the RMV.

This project will support the following performance target:

- Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.
- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **Comprehensive Analysis of Accuracy and Completeness of Crash Data System -- (Highway Safety Plan Task TR-17-10)**
  Fisher College – Center for Leadership in Public Service
  Budget: $259,500.00 (NHTSA, Section 405c)

  A NHTSA Traffic Records Assessment conducted in 2009 found major challenges associated with the quality of the state's crash data. While the TRCC through its member organizations has made progress in improving crash data quality, major challenges remain with regard to quality control, systematic underreporting by local law enforcement, and error management. The use of a Web service to facilitate electronic reporting has enabled the RMV to institute improved monitoring capabilities for those agencies submitting reports through that system.

  After a State has participated in a CDIP Assessment (which was conducted in October 2013), the technical assistance team follows up to provide further clarification and to respond to questions regarding implementation. In some cases, states have opted to contract with for development of a "business plan" to develop projects around the CDIP Assessment recommendations. This project will also assist the State in developing progress measures that can be used to qualify for Section 405 C funds made available for data system improvement.

  The Fisher College team will furthermore work very closely with the TRCC on the development and implementation of a formal crash data quality control program with operationally meaningful measurement of all crash data file components. The Fisher College team will create regularly scheduled presentations of quality control metrics for TRCC meetings.

  Key deliverables:

  - Development and implementation of appropriate crash file quality control measures based on the CDIP assessment outcome and the 2014 Traffic Records Assessment
  - Development and implementation of a crash file quality management program based on Total Quality Management (TQM) principles
  - Regular and detailed crash file data quality reports based on above to the Traffic Records Coordinating Committee
  - Establish training needs assessment program

  This project will support the following performance targets:

  - Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.

- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **State Police Traffic Crash Quality Assurance Project -- (Highway Safety Plan Task TR-17-08)**
  Massachusetts State Police (MSP)
  Budget: $213,231 (NHTSA, Section 405c)

  One traffic records issue that Massachusetts has been hampered with is the inability to fully utilize traffic crash investigation data for strategic and tactical decision-making. Traffic investigations conducted by state and local police agencies are often done on paper and/or a number of unstandardized records management systems. MSP has a legacy records system that collects traffic crash data but does not have a structured set of location data that will allow accurate address matching of crash locations. Troopers have not been provided with a standard business process to enable them to more accurately identify highway locations.

  MSP has also seen a decline in their traffic analysis capability over the last five years. Currently, the resources for collating and analyzing traffic data are insufficient to meet the needs of our troop and station commanders as well as outside traffic safety partners. Furthermore, MSP lacks some specific analytical technology such as geographic information system and statistical programs to effectively examine traffic data.

  In order to provide the MSP, RMV, EOPSS/HSD and the U.S. Department of Transportation with more valid, reliable and timely traffic crash data, MSP developed and implemented a strategy to improve the quality of MSP-investigated crash reports. The project seeks to examine the business process of crash data from investigation through submission to the RMV to determine data collection, processing, and dissemination challenges. This will resolve the integration issues between the MSP and RMV records systems.

  Another component of this project will be to develop a quality assurance and traffic data analysis capability within the MSP. Collaborating with UMassSafe, an existing traffic safety partner, the MSP will leverage knowledge centers to develop a data quality assurance and traffic analysis capability.

  The improved data collection and business processes for submission to the RMV will in turn enable the RMV to improve the state's crash data quality. This improved dataset is then shared with traffic records partners. If traffic records partners wish to review the MSP data specifically, the MSP will provide that data to state agencies with approval to access such data.

The project goals are listed below:

- Identify the quality control issues concerning MSP crash investigation data and reduce missing data by 15%
- Provide solutions to data integration issues between the MSP records systems and the RMV system to reduce the rejection rate by 10%
- Establish a crash analysis capability within the MSP to provide our decision makers and traffic safety partners with accurate and timely traffic safety data

This project will support the following performance targets:

- Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.
- Traffic Records Performance Target #3 To increase by 5% the number of agencies able to access MassTRAC from 160 in April 2016 to 176 in June 2017.
- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **Investigation of Improved Linkage Strategy towards the Development of a Central and Uniformed Crash Analysis Database -- (Highway Safety Plan Task TR-17-07)**
  UMassSAFE
  Budget: $124,209 (NHTSA, Section 405c)

  In order to improve the accessibility, integration, accuracy, completeness, and uniformity of Massachusetts data related to crashes, UMassSafe will investigate improved data linkage processes and strategies for linking highway safety data - crash, roadway inventory, citation, driver history (if available), emergency room, hospital and emergency medical services data. A completely linked dataset would enable highway safety specialists and analysts the unique ability to examine crashes with a complete sense of all related elements from beginning to end including the associated citations, medical consequences, and costs. In addition, the new All-Payers Claim Database (APCD) developed by the Massachusetts Center for Health Information and Analysis (previously DHCFP) would be examined for linkage capability. The APCD is comprised of medical,

pharmacy, and dental claims, for all payers covering Massachusetts residents. The use of this new dataset would provide more accurate and detailed crash consequences and costs.

Previously, Massachusetts utilized NHTSA's CODES probabilistic linkage method to link crash, hospital, and emergency medical service datasets. However, it did not include citation or driver history data. Emergency medical services data was not available at the time of the CODES linkages. However, with improved data and stronger relationships among the various data owners, a deterministic linkage (or partial deterministic sample) may be more viable than in the past. A deterministic linkage generates links based on the number of individual identifiers or several representative identifiers that match among the available data sets. UMassSafe has conducted a number of pilot deterministic linkages including CDS Crash/Citation, CMV SafetyNet/CDS Crash, CMV Inspection/CMV Crash and CDS Crash/Emergency Department. The proposed Investigation of Improved Linkage Strategy Towards the Development of a Central and Uniformed Crash Analysis Database would review and expand on these pilot linkages and also allow for collaborations with various state data stakeholders regarding previous or current data linkages.

A unified and linked data set would improve data quality by utilizing the strongest data fields from each dataset to develop a more complete picture of a crash in addition to comparing data fields within each dataset for accuracy. For example, it is known that the citation field in the crash data system is of less quality than that in the Citation/Adjudication and Driver History database. Furthermore, the quality of injury severity information is of stronger quality in the Injury Surveillance System (emergency room, hospital and emergency medical services data). A linked dataset would allow highway safety specialists to examine factors before, during, and after the crash in order to better understand the causes of such crashes and develop effective crash prevention measures.

The project goals are listed below:

- To provide a crash related linked dataset(s) using the core traffic record systems for improved accessibility, integration, accuracy, and completeness. The dataset(s) would be used by traffic records stakeholders and data analysis for data quality improvements and crash data analysis.
- To make accessible a minimum of two crash- related linked datasets for crash data analysis
- To increase the number of core traffic record systems linked to each other from one to at least two.
- To identify a minimum of five common fields (identical or similar) among the core traffic records systems with discrepancies or incomplete data with recommendations for correction.

This project will support the following performance target:

- Traffic Records Performance Target #2 To improve the integration of traffic records systems by increasing the number of linked crash reports to hospital inpatient records by 10% from 91,000 in 2007 to 100,100 by September 2017.

- **Motor Vehicle Automated Citation and Crash System (MACCS)**
  EOPSS Program Management Office
  (Approximately $600,000 of FFY 2017 Section 405c; $287,745.32 of FFY 2010 Section 408; $500,000 of FFY 2009 Section 408; $3,712,254.68 of Section 402, approximately $1.3 million of funding from the Federal Motor Carrier Safety Administration was provided to MassDOT for a portion of this project). The Executive-Level TRCC voted to allocate all FFY 2017 Section 405c funding and any other unspent Traffic Records funding to this project.

  MACCS is a browser-based application that will be available statewide for the purpose of collecting, reconciling, and exchanging motor vehicle incident information including: electronic citation reporting, crash reporting, and traffic stop data collection. The MACCS project is the result of a partnership between EOPSS, local and state law enforcement, and the MassDOT. The project has been funded with a combination of capital funds and grants from NHTSA.

  The goals of the MACCS project are to ensure greater officer safety by making the reporting process more efficient at the roadside, improve data quality by implementing checks at the point of entry and upon submittal, and eliminate redundant data entry processes for agencies across Massachusetts. The MACCS pilot commenced in July 2013 to field test the application and in-vehicle hardware (i.e. scanners, printers), identify deficiencies and potential improvements, and support proactive planning in the future potential rollout of the MACCS system statewide.

  The initial MACCS pilot was conducted over a nine month period to test system functionality and data exchanges with a targeted number of agencies and end-users representing a diverse cross-section of the Commonwealth's public safety community. The pilot sites were rolled out incrementally, with feedback from users on each new deployment informing changes to be tested in the next iteration. Feedback was gathered through a formal error/enhancement reporting processes, as well as several working group meetings with the project team and the end-user community. Results and feedback from the pilot have been instrumental in informing the ongoing development of MACCS, as well the strategy for a future roll-out of MACCS components statewide.

  In an effort to facilitate and enable data-driven strategies such as DDACTS, and in support of its own strategic plan, EOPSS has initiated the Public Safety Data Analytics Platform and Tool (ADAPT) project, using a joint funding strategy that

leverages the NHTSA grant as well as Commonwealth of Massachusetts capital funding. Extensive work on this tool was conducted in the past year. While ADAPT will provide public safety analysts, managers, and policy-makers with the ability to analyze a range of existing public safety data, ADAPT functionality will first be demonstrated through the use of a prototype that focuses on crash data, with additional public safety data sets added to:

- Demonstrate the utility of ADAPT across various public safety data sets
- Support co-presentation and visualization of different public safety data sets in support of cross-functional data analysis
- Enable the development of data-driven operational models

In the past year EOPSS has worked with the RMV to conduct an additional test of the crash reporting module, this time with data validation conducted at the RMV. The Project Team expects to have the first law enforcement agency live with crash reporting via MACCS in July 2016. EOPSS is currently working with the RMVM Modernization Project Team and the MRB to develop the XML data exchange schemas, using National Information Exchange Model (NIEM) standards, for transmitting citation data between MRB and the CJIS Broker. EOPSS has established web services designed to provide an asynchronous method of sending data and receiving responses related to citation and crash system data. The MRB was able to begin testing the electronic exchange of data with the Commonwealth's vendor in June 2016. In addition, revised legislation has been advanced over the last several months to allow for the electronic issuance of citations in Massachusetts; and may be passed as early as the summer of 2016 (although this is still unknown). The Project Team is also working closely with the Executive Office of the Trial Courts and Boston Municipal Courts on how the routing of electronically generated criminal citations will be handled.

Next Steps

- Continue working with the MRB on their readiness to receive and apply electronically generated citations to the existing mainframe technology
- Monitor the passage of revised legislation and work with the MRB to determine what volume of electronic citations they could process in the near term (we expect a gradual transition from paper to electronic for many municipal agencies)
- Continue working with the courts and MRB on outstanding issues related to the processing of criminal citations
- Work with record management system vendors to implement a data exchange via the iCJIS Broker technology
- Continue development of the data analytics platform

This project will support the following performance targets:

- Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.
- Traffic Records Performance Target #2 To improve the integration of traffic records systems by increasing the number of linked crash reports to hospital inpatient records by 10% from 91,000 in 2007 to 100,100 by September 2017.
- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **eCitation**

  MRB

  Please note: This description below provides additional information for the electronic citation portion of the MACCS project summarized above.

  The MACCS Project includes developing electronic submission and processing of motor vehicle violation citations. The Registry of Motor Vehicles Modernization (RMVM) Project provides MRB with the opportunity to work with EOPSS to automate the citation process.

  EOPSS is currently working on a project to equip state and municipal police vehicles with mobile data terminals to issue electronic citations. This will reduce the labor-intensive process of processing paper citations and manual maintenance of driving records. This project will improve the timeliness, accuracy, completeness, integration, and accessibility of driving history records and citation data.

  The MRB and EOPSS have been developing the XML data exchange schemas, using NIEM standards, for transmitting citation data between MRB and the CJIS Broker. EOPSS has established web services designed to provide an asynchronous method of sending data and receiving responses related to citation and crash system data.

  Automating the citation process will enable police officers to electronically capture citation data through a mobile device and transmit it over cellular networks to their law enforcement agency. The data is verified and then transmitted to the CJIS Broker, which then forwards the data to MRB.

  Thus far, work on the business requirements includes:

  - Establishing a data exchange methodology, software requirements and the XML structures necessary to exchange data electronically

- Creating a Citation Component Mapping Worksheet to document the data to be transferred and the format to be used
- Documenting Use Cases for citation data interchange
- Exchanging information on coding tables currently in use for various data fields involved in the exchange

The benefits of electronic citations for traffic records management include:

- Improved completeness and accuracy of records by replacing paper citations with the ability to collect and edit data at point of capture, including use of drop-down menus and automated data validation.
- Improved timeliness of reporting
- Timely submission will allow violators nearly immediate access to the citation record and allow for on-line processing of payments or clerk magistrate hearing requests.
- Data collected by law enforcement will be available faster, and in a more accessible form to agencies that rely on this information for business decision-making, forecasting, and analysis, including RMV, EOPSS, police departments, and courts.
- Enables the addition of warnings to driving history records to provide police officers with more comprehensive information, allowing officers to make better informed decisions on whether or not to issue a citation.
- More timely, accurate, and complete driving history records will allow for prompt application of suspension/revocation actions, promoting public safety.
- Improve Public Safety

- **Scanning Solution for Police Crash Reports -- (Highway Safety Plan Task TR-17-05)**
  RMV
  Projected Completion Date: September 2016
  Budget: ($287,745.32 – Approximately $80,000 of Section 402 and the remaining will be NHTSA, Section 405c)

  Since this scanning project originally was proposed in 2009, the RMV has completed development of an Internet service, with web-monitoring tools and forms. This project was completed in April 2010. Users were given a secure passcode and have the ability to access the entire crash report by this method. Since only electronically submitted crash reports now show the crash location diagram and narrative, this project provides that missing piece through a scanning process. The reports received by the RMV in paper form are scanned into FileNet and linked via a barcode to the crash file in CDS. The retrieval

process allows the end user to access the entire report and, in cases where the report was a paper submission, they are also able to access the "linked" narrative and diagram. The users are able to view and print these documents, which will be in the form of a PDF file.

Previously, if an end user could not access the diagram and narrative from a crash report or the location data in CDS did not validate, they would make a request to the RMV Accident Records staff for a paper copy of this information. End users who needed location data include TRCC members, state police, municipal police, MassDOT, and regional planners involved in traffic safety projects and planning. Two-thirds of the crash reports were received in paper form, and the RMV staff could not enter the narrative and diagram into the system for these reports. This project eliminates this need, thereby increasing the accessibility of crash data available to end uses of the data.

This project will support the following performance targets:

- Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.
- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **Electronic Submission of Crash Reports (Year 3) -- (Highway Safety Plan Task TR-17-06)**
  RMV
  Budget: $320,000 (NHTSA, Section 408)

  This project aims to continue the progress made in Year 1 and 2. This project will continue to increase the number of local police departments that submit crash data; currently there are 185. The RMV will upgrade and add fields to ID Shield Software (redaction tool) since the form has been changed and scanned images will be available through the Web Crash Retrieval Transaction. The goal of this project is to increase the overall quality of crash data that is received and stored by the RMV.

  This project will support the following performance target:

  - Traffic Records Performance Target #1 To improve the completeness of the crash system by increasing the percentage of crashes that have been

geocoded and linked to the roadway file from 96 % in 2013 to 98% by June 30, 2017.

- Traffic Records Performance Target #4 To improve the timeliness of crash data by decreasing the average number of days from crash incident to receipt of crash report by the RMV from 56.14 days in 2013 to fewer than 50 days in 2016.

- **MassDOT Project Planning System**
  MassDOT, Office of Transportation Planning
  Budget: Estimated costs through August-September 2016: $400,000 ($250,000 through SHRP2 Expediting Project Delivery (C19); $150,000 through OTP / FHWA)

  This project consists of development of new web application for online project planning and mapping, automated analysis, and generation of Project Need and Project Initiation Forms (PNF & PIF).

- **Massachusetts Traffic Records Analysis Center (MassTRAC) (Highway Safety Plan Task TR-17-01)**
  **Section 402 funding from NHTSA was used to develop this system**
  **EOPSS/ HSD**

  At the start of FFY 2009, the EOPSS/HSD had limited access to crash and citation data. The data were housed in different locations and required manual processes for analysis. In FFY 2009, EOPSS/HSD was able to revitalize and improve upon a data storage and analysis tool to aide in problem identification and analysis.

  To facilitate EOPSS/HSD's ability to obtain and analyze traffic safety data, a new generation of the Commonwealth's traffic safety information portal was established. The EOPSS/HSD worked with its contractor to develop MassTRAC, a web-based solution for crash records analysis, mapping, and reporting. This tool helps meet Federal reporting requirements and supports safety planning processes across the Commonwealth. The software provides quick and easy user access to crash data, tabulations, maps, and counts of crashes, vehicles, drivers, passengers, and non-motorists. Predefined filters and classifications are designed to support the needs of users with various levels of skill and training, and ad hoc reporting functions allow users to produce custom reports of crash statistics for any subset of records. Designed and implemented as a rich Internet application, the system was developed using C#, Flex, and Oracle, with fully integrated GIS capabilities that leverage Mass GIS infrastructure, data, and services. The data warehouse has been optimized to provide superb response times as the database grows to 10 million records and beyond. The second phase of the project included the addition of citation and violation data, support for more complex queries and ad hoc reports, and provided enhanced GIS analysis and mapping capabilities. In FFY 2010, EOPSS/HSD broadened the functionality of the system to address the unique needs of state and local law enforcement. This tool allows

users to more effectively identify problem locations, and target their human and financial resources in the areas of greatest need.

Since MassTRAC was developed, over 150 traffic safety stakeholders, including law enforcement, have access to MassTRAC. In FFY 2017, EOPSS/HSD will focus on adding updated crash and citation data to MassTRAC

This project will support the following performance target:

- Traffic Records Performance Target #3 To increase by 5% the number of agencies able to access MassTRAC from 160 in April 2016 to 176 in June 2017.

## 5.2 COMPLETED PROJECTS

- **Federal Motor Carrier Safety Administration (FMCSA) Project**
  RMV
  Budget: $299, 664 (FMCSA, SaDIP 2008) and $89,869 (FMCSA, SaDIP 2009)
  Project Completed

  The RMV applied for SaDIP grant funding to improve its Commercial Motor Vehicle (CMV) Crash Data reporting and processes, and is the lead agency that conducted this grant activity. The major goals of these projects were to improve Massachusetts' overall state data quality rating, which is determined by an examination of crash data by the FMCSA.

  CMV crash records were downloaded from the RMV CDS by the Massachusetts State Police and then uploaded into the Motor Carrier Management Information System (MCMIS). The project focused on these records and this process due to the problems that existed in the way this data was being reported, data-entered, and transferred. Funding was also used to redesign the crash report form and to develop both a classroom and online training for law enforcement personnel. These courses have been added to the MSP Training Academy.

  In 2007, this state's rating was upgraded from "poor" to "fair" in the area of crash accuracy. Massachusetts' current overall rating is green ("good"), as of April 2014.

- **Motor Carrier Safety Assistance Program (MCSAP)**
  RMV
  Budget: $115,181.04 (FMCSA)
  End Date: September 30, 2008

  Since the MCMIS relies on data imported from all states to create its Crash Files, it has set up monitoring and performance measures which it administers in all states, to ensure the reliability of that data. FMCSA publishes the findings of its performance evaluations in a document titled "State Safety Data Quality." It rates each state in accordance with a color scheme where green is "good," yellow is "fair," and red is "poor." In this report published September 22, 2006, Massachusetts was one of six (red) states with an overall ranking of "poor."

  The scope of this project involved two separate and distinct proposals that had been developed to improve the rating of Massachusetts relative to its commercial motor vehicle crash data. The first proposal was intended to address problems specifically within the agency that will result in both more reliable commercial crash data and more efficient and effective processes with regard to obtaining and sharing that data with other agency partners who rely on the RMV.

  The RMV hired a contracted, part-time, qualified information technology person to develop and implement technological solutions needed to make the current

Oracle database that comprises the Crash Data system more efficient, effective and accurate in order to provide more reliable data to crash data users, with a specific focus on the needs of the Massachusetts State Police.

The RMV also hired a contracted, part-time consultant to advise and assist the RMV in the development of business practice changes and improvements that will contribute to better, more accurate, timely and complete commercial motor vehicle crash data and its availability to crash data users and agency partners.

- **Electronic Submission of Crash Reports (Year 1 and 2)**
  RMV
  Budget: Year 1- $187,736 and Year 2-$360,680 (NHTSA, Section 408)
  Project Completed

  The goal for this project was to improve the accessibility of crash data in the Crash Data System by demonstrating a measured decrease in the number of problematic crash reports. There are tremendous benefits to the entire crash records community when crash reports are received electronically instead of on paper. Some of these benefits are improved data quality (no data entry), timeliness (can be sent quicker), less effort (no duplicate data entry), and an electronic version of the diagram and narrative are available in the system.

- **MassDOT Crash Portal, Crash Records Web Reporting**
  **MassDOT Highway Division, Traffic Engineering and Safety section**

  As part of the crash geocoding application that Geonetics has built for the Traffic Engineering and Safety Section of MassDOT Highway Division, a set of reporting tools has been under development for several years. These tools implemented in 2010 as the "MassDOT Crash Portal." This web-based system includes the following components:

  - Standard Reports for Cities/Towns by year. Users can request a spreadsheet standard report listing of all crashes in a particular city or town for a specified year as an Excel file (for years 2002 through 2012.
  - Ad Hoc Query Tool. Users can query the Statewide crash data file to obtain a listing of specified crashes that meet user-specified criteria. This module can be used to map selected crashes that are capable of being located on a map.
  - Mapping of crashes within a specified geographic location (can also be used in conjunction with Ad Hoc Query Tool described above). Only crashes that have been geocoded (approximately 85%) are capable of being mapped (for years 2002 through 2012.

  The Highway Division of MassDOT has had an internal Ad Hoc query tool available for several years. MassDOT Traffic Engineering has been providing

crash data files to requestors for many years. The external Crash Portal has automated the request process so that crash data files can be automatically obtained through the web application without human intervention by Traffic Engineering staff.

The MassDOT Crash Portal was implemented in August 2012, and is accessible via the web at: http://services.massdot.state.ma.us/crashportal.

- **Increasing Blood Alcohol Concentration (BAC) Reporting in Massachusetts**
  EOPSS/HSD, Municipal Police Training Committee, and the RMV
  Budget: $75,000 (NHTSA, Cooperative Agreement)
  End Date: September 2013

  EOPSS/HSD received funding from NHTSA to increase BAC reporting in Massachusetts. For this project, EOPSS/HSD worked with the RMV, the TRCC, and law enforcement to add data elements and attributes to the Commonwealth Motor Vehicle Crash Exchange Form and the RMV crash data system. The BAC for deceased drivers is obtained from the Office of the Chief Medical Examiner. This change would allow police departments to submit BAC data for the drivers who survive the crashes.

  The Municipal Police Training Committee (MPTC) developed a training for municipal law enforcement officers and the Massachusetts State Police on BAC testing and reporting. MPTC is an agency of EOPSS and serves the Commonwealth by establishing training standards and by providing formal training and development programs to the men and women who serve as municipal police officers. Each year, the MPTC directly contributes to public safety by making training available for the more than 16,000 municipal police professionals in the Commonwealth.

- **Regional Meetings with Law Enforcement to Discuss How State Agencies Use Crash Reports**
  MassDOT Highway Division, RMV and EOPSS/HSD
  Budget: No Cost

  To help improve the Commonwealth's crash data, MassDOT Highway Division, RMV, and EOPSS/HSD worked together to conduct regional meetings with local law enforcement agencies to discuss how state agencies use data from police crash reports and why this data is crucial to traffic safety. These meetings also gave law enforcement an opportunity to ask questions and explain some of the difficulties they may have with reporting. To date, eight regional meetings have been conducted with approximately 101 officers representing 65 departments.

- **Accident Analytics Interface**
  Newton Police Department
  Budget: $83,500 of Section 405c was allocated to this project, but the Project Manager for the Newton Police Department decided to develop this application on his own time
  The project was completed in FFY 2014

  Based on the severity of the crash, Newton police officers will complete a crash report. When no crash report is required, the operators will complete an Operators Crash Report and submit it to the RMV and the Newton Police Department. The Newton Police Department had no way of analyzing the data for locations or actual cause. By providing a uniform interface for the input of data, the analysis will have the highest level of consistency, providing meaningful analytics.

  This system allows officers to directly input crash information when responding. This allows the Newton Police Department to assist in determining cause and conditions that might be mitigated in the future. The Newton Police Department has become proactive regarding dangerous intersections and driving habits. Having current information assists the department in determining the location of directed patrols in areas that require immediate attention. The interface will improve data integrity, accuracy and integration with the Newton Police Department records management system and the RMV's crash data system.

- **Electronic Crash Reporting System and Data Collection**
  Brookline Police Department
  Budget: $82,500 (NHTSA, Section 408)
  Projected End Date: June 30, 2014

  Prior to this project, the Brookline Police Department currently delivered crash reports to the RMV on paper. Studies have shown that the paper reporting process is more prone to errors than electronic submissions and the data that is reported on the crash forms is only recorded at the initial time of the crash. This does not result in accurate data as available information increases from the time of the initial call, (i.e. injuries, number of vehicles, location, etc.). All data reported on the crash forms must be manually searched in order to develop a "Hotspot Report."

  The goal of this project is to submit electronic crash data to the RMV and other state agencies as requested in a manner that is both efficient and accurate. As of June 2015, the Brookline Police Department is working with the RMV to set up the necessary network connection to allow them to submit crash data electronically to the RMV.

- **Predictive Traffic Analytics Using MassTRAC Data**
  Fisher College - Center for Leadership in Public Service
  Budget: $156,845.76 (NHTSA, Section 408)
  Projected End Date: June 30, 2014

  The purpose of this project was to assess and contribute to the improvement of the accuracy and completeness of the CDS as well as Citation/Adjudication data. The project also demonstrated methods to improve data accessibility, in particular in the context of advanced data analysis, e.g. data mining, predictive analytics, and business or policy intelligence. As such, the project will implicitly highlight the effectiveness and progress of previous efforts made to improve the six core data system by demonstrating how these core data systems can be utilized for improved traffic safety policy development within the Commonwealth of Massachusetts. The project specifically 1) evaluated the full extent to which such data quality problems exist; 2) assessed the precise impact these data quality problems, in particular missing data, may or may not have on using crash data for analysis purposes; 3) recommended appropriate remedial measures to improve crash data quality; and 4) demonstrates the usefulness of advanced statistical methods, such as data mining and predictive analysis, in the analysis of crash data as well in the analysis of citation data (which is considered to be of excellent quality.) A draft final report was completed but it is the processed a being finalized.

- **Boston Vehicle & Pedestrian Accident Information System Enhancement**
  Boston EMS / Boston Public Health Commission
  Budget: $96,720 (NHTSA, Section 408)
  End Date: February 2014

  The Boston Vehicle & Pedestrian Accident Information System Enhancement project was led by Boston EMS, a bureau of the Boston Public Health Commission (the city's health department.) Boston EMS is the provider of emergency medical services for Boston. Last year, their team of highly trained emergency medical technicians and paramedics responded to nearly 110,000 calls for help and transported approximately 80,000 patients to area hospitals. They are the largest municipal provider of EMS in New England and one of the busiest services in the country. Boston EMS strives to improve access to healthcare across the city and provide all patients with the best pre-hospital emergency care in the country.

  The goal of this project was to improve the city's motor vehicle, bike and pedestrian crash information system – addressing information gaps, inconsistent data gathering and analysis and the lack of usable real time data to guide decisions on traffic safety and transportation policy in Boston.

Additional information about phase two of the project can be found in Section 5.1 on page 5-22. Information about their proposed project for FFY 2016 can be found in 5.1 on page 5-6.

- **Automated Traffic Crash Reporting with GPS Location Identification**
  Danvers Police Department
  Budget: $30,767.45 (NHTSA, Section 408)
  Projected End Date: June 30, 2014

  The Danvers Police Department is a state and nationally accredited police agency with a sworn complement of forty-six officers, eight civilian public safety dispatchers, a crime analyst, an executive assistant and two records clerks. In total, the Town of Danvers has 128.14 miles of roadway. Motor vehicle crashes (1,309 incidents) account for the third most frequent calls for service that the department responded to in 2010.

  The primary project goal was to enable police officers to electronically capture license and motor vehicle data sets at roadside operations, thereby enhancing officer safety, reducing workload, and enhancing data quality and accuracy, coupled with accurately identifying crash locations and providing more timely transmission of crash reports and citations to TRCC stakeholders.

  The intent of this project was to decrease the number of days it takes from the time a crash occurs or citation is issued to the time this information is submitted to the RMV and MRB. The Danvers Police Department began submitting crash reports electronically to the RMV in January 2015.

- **Improving Crash Data System Location Data Entry/Validation Tables and Inclusion of Police Incident Number in Crash Data**
  MassDOT
  Budget: $300,000 (NHTSA, Section 408)
  Projected End Date: June 2014

  Based on crash data between 2007 and 2009, approximately 89% of the crashes have been geocoded to a point and were then able to be linked to the roadway file to obtain pertinent roadway data. However, approximately 9% of those crashes had to be manually geocoded, and many were done using a time consuming process (by MassDOT staff) to try and reconcile the roadway names used on the crash report with the roadway names contained in the road inventory file. Additionally, of the 11% of crashes that were not geocoded, some of them could have been geocoded if resources/staffing time allowed. Therefore, improving the data quality of the road inventory file roadway names will help to improve the overall geocoding rate to enhance quality and integration (between roadway and crash) of the data.

  The outdated, 10-year old roadway name pick lists (used by the RMV, MSP, MassDOT Highway Division and many local police departments) was updated

to reflect the most up-to-date road name data which will in turn enhance data quality and location information. Also, the crash form and the crash data system was updated to include the police incident numbers. This will help to provide an improved feedback loop with state and local police departments to further improve data quality.

- **Detecting Drug Impaired Drivers**
  Massachusetts State Police Forensic Services Group
  Budget: $34,000 (NHTSA, Section 408)
  End Date: September 30, 2013

  The Forensic Services Group purchased items that will enhance the operation of an Accurate Mass Q-TOF LC/MS system. This Q-TOF system, purchased with prior grant funding, is used to detect drugs and other substances of impairment in the blood and urine of operators arrested for driving under the influence of alcohol and/or drugs.

  Results obtained from this system will be reported to the law enforcement department submitting the impaired driver sample. The results are also reported in a Laboratory Information System, which all District Attorney's Offices can access by a secure portal. The Prosecutor's module will contain the electronic report of the tested items from the submitting agency including a chain of custody of all items submitted.

  The results will be used by the court as a C.90 s. 24 N hearing to determine the license suspension of an alleged drug impaired driver. The results will also be used by the courts at time of trial to determine if the alleged driver is guilty of driving under the influence of drugs in accordance with M.G.L. c. 90 s. 2.

  One goal of this project was to decrease the turnaround time for detecting drugs and substances of impairment in the blood and urine of drivers. Another goal is to increase the types of drugs and substances that can be detected in the blood and urine of impaired drivers.

- **Traffic Records Business Plan and Traffic Records Assessment**
  EOPSS/HSD
  Budget: $180,000 ( NHTSA, Section 408)
  Project Completed

  The Statewide Traffic Records Business Plan provides a clear identification of need and agreed upon action to be taken to mitigate the needs of data collectors, owners and managers, and users of traffic records-related information systems. The plan serves as a road map for the data collectors, core system owners, and the TRCC.

- **Department of Fire Services (DFS) Analysis for MATRIS and MFIRS**
  DFS
  Budget: $40,284 (NHTSA, Section 408)
  Project Completed

  One of DFS's main goals for this project was to augment DFS's data analysis capability by developing a "mini data warehouse" that will allow DFS to perform multi-year multi-variable analysis that it presently cannot do with the size and structure of the MFIRS database. The plotter, which was purchased for this grant, allows DFS to visually see trends in fire department response and incident type locations as well as now being able to create and distribute maps as needed.

- **Bicycle Data Updates to the Road Inventory**
  MassDOT, Office of Transportation Planning
  Budget: $110,000
  Project Completed

  This project included adding new line work and attribute data for shared-use paths to the roadway inventory file.

- **Intersection Data Plotting and GIS**
  MassDOT, Office of Transportation Planning
  Budget: $87,000
  Project Completed

  This project consisted of building a GIS layer of all intersections for purposes of crash analysis, ADA compliance, etc.

- **Curve and Grade Updates to the Road Inventory**
  MassDOT, Office of Transportation Planning
  Budget: $50,000
  Project Completed

  This project enhanced the grade data for all arcs in the roadway inventory file.

- **Comprehensive Mile Posting System Covering All Numbered Routes**
  MassDOT, Office of Transportation Planning
  Budget: $50,000
  Project Completed

  This project included applying new mile marker signs in the field to Planning's GIS database by linking GPS coordinates.

- **"Unique Identifier" IDs**
  MassDOT, Office of Transportation Planning
  Budget: $75,000
  Project Completed

  This project included developing and implementing a system of fixed ID values for every arc in the RIF that does not change from one annual published roadway inventory file to the next.

- **Roads and Highways Implementation**
  MassDOT, Office of Transportation Planning
  Budget: $560,000
  Project Completed

  This project included creating a new linear referencing system for all roads, including local streets through the implementation of the ESRI Roads and Highways application.

- **Physical Attribute Updates to the Road Inventory**
  MassDOT, Office of Transportation Planning
  Budget: $100,000
  Project Completed

  This project consisted of updating numerous data fields for all numbered routes (thousands of records) in the Roadway Inventory File (RIF).

- **MATRIS and Trauma Registry Updates**
  DPH
  Below is an overview of projects completed by DPH over the past few years

  The Trauma Registry submission infrastructure and helpdesk were migrated from the Center for Health Information Analysis (CHIA) Data center to the new datacenter at MassIT and the help desk managed by EHS' Health Safety Net.
  A Trauma Registry User Guide/Training Manual was developed for use by the hospitals submitting data instructing them on registering to submit, the submission process and addressing common issues. OEMS also developed IT Systems Operations guide and Data Flow documents required per EHS IT standards in order to implement upgrades to the Trauma Registry for ICD-10-CM and AIS 2005 Update 2008 in 2015.

  In December 2014 a report was produced from MATRIS of Pedestrian and Bicycle crash incidents by city to inform the designation of funding to towns for the Bicycle and Pedestrian Safety Awareness and Enforcement Program. The program leverages NHSTA funding to the towns to reduce the number of crashes involving bicycles and pedestrians and enhance safe travel.

  Motorcycle Crash EMS Incident Annual Reports of crashes by age, gender, day of week and time of month were created for the Motorcycle Safety Education Program in the fall of 2013 and 2014.

  The South Shore Hospital QA/QI (Quality Assurance/Quality Improvement) pilot program using MATRIS data was implemented. The project was written up for The NEMSIS TAC Best Practices Spotlight newsletter which highlights EMS agencies that are effectively integrating NEMSIS data to serve local and state public health and safety needs. The article can be found at this link:

http://nemsis.org/documents/BestPracticesSpotlightNewsletter.vol1.8.19.14_000.pdf or **Best Practices Spotlight.** The hospital uses MATRIS to access the trip records for 10 services to perform QA/QI review and feedback. This leads to better data quality and timeliness of data submission to MATRIS from the services. A number of other hospitals performing QA/QI for different services are interested in using MATRIS similarly and Massachusetts is working with them to rollout this program broadly.

The MATRIS database was upgraded to SQL Server 2012 which improved performance and incident look up functionality. It also allowed access to a robust QA/QI Module that will be implemented by the hospitals leveraging MATRIS for QA/QI.

The MATRIS Ambulance Service "Data Quality Report" was implemented for Massachusetts ambulance services. The report was funded and built in collaboration with the other New England States through the common state NEMSIS vendor. The report tool has been leveraged for many services to review summary level data quality with counts and percentages of the responses for a time period or critical data elements. It also measures the days from incident to submission, and includes a tiered ranking of validation scores. It has been instrumental in improving data quality, completeness and timeliness with services. It is a valuable collaborative tool to illustrate issues from the agency to their ePCR vendors for resolution, and to measure improvement as they are addressed.

- **Continued Deployment of Trauma Quality Improvements for Crash Injury Reports**
  Bureau of Healthcare Safety & Quality/Massachusetts DPH
  Budget: $122,068 (NHTSA, Section 408)
  End Date: September 30, 2013

  This project was a continuation of previously funded work to enhance key state injury surveillance data systems and use that data to inform the improvement of trauma care and analysis of motor vehicle crash by traffic safety stakeholders. The result of this project was the creation of State Trauma System quality improvement reports that entail action processes for the ongoing Massachusetts MDPH use of State Trauma Registry Data and EMS data for system performance improvement. The includes reviewing requirements for state submission of de-identified data to the NEMSIS TAC national repository and for the MassDOT RMV to routinely access data elements in MATRIS for the Fatality Analysis Reporting System ( FARS).

  Since both MATRIS and the Trauma Registry are live, the next performance measure entails using NEMSIS EMS performance benchmarks to monitor major trauma triage to trauma center rate, with the benchmark being to ensure as close as possible that 100% of major trauma cases receive trauma center care.

- **The Massachusetts Strategic Deployment of New Statewide Trauma Quality Improvement Utilizing Population-based Highway Safety Information Systems**
  Massachusetts DPH
  Budget: $121,822 (NHTSA, Section 408)
  End Date: September 30, 2012

  This project entails the completion of critical enhancements to key State data systems and the use of that data to inform the development of a State Trauma Plan through an American College of Surgeons State Trauma Consultation Visit. This project entails a Statewide Trauma System Consultation by the American College of Surgeons concurrent to critical enhancements to insurance claims data, State Trauma Registry, and prehospital EMS data for critical trauma system planning benchmarks.

  The result of this project is to be the creation of a State Trauma System Plan that entails action processes for the ongoing Massachusetts DPH use of State Trauma Registry Data and EMS data for system performance improvement. The true extent of access to outpatient and inpatient care for injured patients is captured in insurance claims data. Specifically for traumatic injuries, several studies have found insurance status to be a robust predictor of trauma mortality. One of the system enhancements in this project includes incorporating into the Massachusetts Division of Healthcare, Finance & Policy (DHCFP), and a geocoding process for the all payer claims data. This process will allow DHCFP to create census specific analytic reports of utility to MDPH and other State agencies.

  This project involved a multidisciplinary team review and technical assistance consultation review of the State's Trauma System performed at the request of the DPH by the American College of Surgeons. The trauma systems consultation is a voluntary program to assist States in making needed improvements to trauma care and will provide the definitive means of identifying and closing gaps in trauma care that can further lower the State's motor vehicle fatality rate. The consultation team will issue a final report that will be used for the MDPH to create the State's Trauma Plan.

  These enhancements will make a major contribution to improving the timeliness, accuracy, completeness, uniformity, integration, and accessibility of the safety data information for motor vehicle crash analysis. These enhancements will also facilitate efforts to evaluate the effectiveness of trauma care programs and identify improvements needed. The improved data quality resulting from these enhancements will enhance the integrity of the data for future state linkage projects and improve compatibility and interoperability with national repositories.

  Since both MATRIS and the Trauma Registry are live, the next performance measure entails using NEMSIS EMS performance benchmarks to monitor major

trauma triage to trauma center rate, with the benchmark being to ensure as close as possible that 100% of major trauma cases receive trauma center care.

This project would have a quantified and verifiable deliverable – increasing the number of services that are, and do, submit their patient care information electronically. DPH will be able to independently verify the data submission by the organizations that benefit from the funding in this grant.

Notes: Unspent funds from previous years were combined with FFY 2011 funding to support these programs.

- **Improving Continuity of Trauma Care for Severely Injured Motor Vehicle Crash Victims through Enhanced State EMS and Trauma Data Completeness, Accuracy and Integration**
  Massachusetts DPH
  Budget: $56,600( NHTSA, Section 408)
  End Date: June 2012

  Massachusetts investigators previously have determined that annually up to 90 lives of motor vehicle crash victims alone could have been saved if they had been more efficiently pre-hospital triaged (Mango N et al; J Trauma 2007; 62: 436-460). Recently, the Chairman of the Massachusetts State Trauma Committee, analyzing over 235,000 drivers in motor vehicle crashes recorded in the National Trauma Data Bank, determined that crash victims had higher odds of mortality due to shock, as reflected by first systolic blood pressure reported. It was concluded that this information could help clinicians to determine expected outcomes of a patient on arrival in a trauma center (Millham F et al; World J Surg (2009); 33: 23-33). This project will fill gaps in completeness and accuracy of physiologic pre-hospital triage data on motor vehicle crash victims and has the potential to save lives of crash victims who are at risk of hypovolemic shock by having engineers enhance system algorithms for ensuring the quality and integration of physiologic data for both the state's trauma data system and EMS data system.

  Enhancements in the quality of data will be followed by the integration of trauma and EMS data for researching the outcomes of patients and specifically focusing on patterns where a crash victim's life might be at greater risk due to hypovolemic shock. There will be targeted monitoring of motor vehicle crash patients with hypovolemic shock or who have a maximum abbreviated injury scale (MAIS) score greater than three to ensure the continuity of data available to providers.

- **Electronic Patient Care Records Design and Pilot Massachusetts DPH and**
  DPH's EMS Regions 1 and 5
  Budget: $160,000 (NHTSA, Section 408)
  End Date: June 2012

  At their April 22, 2010 meeting, the METRCC determined that projects submitted by Southeastern Massachusetts EMS Council, Inc. and Millville Fire Rescue should be combined and joined with an effort to define the necessary standards

and protocols for electronic data transfer to the DPH. The result is the Electronic Patient Care Records Design and Pilot project.

Information on patient care from EMS providers and other first responders is critical both to the short-term treatment of motor vehicle crash victims by hospitals and to the long-term investigation of crash-related causes and outcomes. Currently, much of this information is captured on paper. Use of paper forms negatively impacts the quality and timeliness of these data. Computerized systems for patient care records will improve data quality by validating that information is complete and accurate. Transferring these records to a central location at the DPH will ensure that this information is delivered quickly and accurately to authorized parties. This process is consistent with the desire to electronically capture and distribute traffic records information in the Commonwealth of Massachusetts.

- **MATRIS Piloting and Trauma Registry Crash Injury Linkage Launch**
  Massachusetts DPH
  Budget: $139,319.32 (NHTSA, Section 408)
  Project Completed

  Massachusetts had lacked EMS and trauma injury surveillance systems to analyze the continuum of clinical care provided to motor vehicle crash patients and to use this data in linkage to identify the specific causes of risk variability needed to drive evidenced-based safety policies such as a statewide primary seat belt law. The goal of this project was to complete the components needed for the piloting and rollout of the EMS collection system MATRIS and test launch the linkage of the first quarter's trauma registry data with the police crash report data. The goal of both the MATRIS and Trauma Registry data collection has been to develop inclusive systems that assure the collection of data from all providers.

- **Trauma Registry/MATRIS**
  Massachusetts DPH
  Budget: $350,000 (NHTSA, Section 408)
  Project Completed

  The goal of both the Trauma Registry and MATRIS data collection project was to develop inclusive systems that assure the collection of data from all providers. Trauma Registry and EMS Data is being integrated with existing population-based hospital data repositories to provide one of the most in-depth injury surveillance systems in the nation.